

The Milbank Memorial Fund
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IN THIS ISSUE

THE paper "The Risk of Disability for Persons with Chronic Disease" by Jean Downes and Marguerite Keller presents an analysis based upon cases reported in the morbidity study in a sample population of the Eastern Health District of Baltimore. When disabling episodes of chronic disease were related to the population at special risk of such episodes, that is, the cases themselves, males had a greater risk of disability from arthritis, heart disease, hypertensive vascular disease, and diabetes than was true of females. Males also had a greater risk of becoming permanently disabled than did females. Data showing the risk of disability among persons with specific chronic diseases in successive years after a first diagnosis of the condition is made are also presented.

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Morbidity surveys which are conducted by periodic visits to families offer special advantages in the study of incidence and prevalence of non-reportable diseases, such as rheumatic fever and streptococcal illness, in their population.

The paper "Rheumatic Fever and Streptococcal Illness in Two Communities in New York State" by Jane E. Coulter presents data on the incidence of streptococcal illness and on the incidence and prevalence of rheumatic fever reported in the study of acute respiratory illness in two communities, Pleasantville and Mt. Kisco, in Westchester County, New York.

It was found that a familial susceptibility to streptococcal illness may exist in rheumatic families. These data are in agreement with the belief that rheumatic fever is a disease closely related to streptococcal infections.

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The article, "Institutional Factors in Sinhalese Fertility," was prepared by Dr. Bryce Ryan on the basis of his study of the problem while spending several years in the Department of Sociology at the University of Ceylon. Studies such as this are of fundamental importance and it is singularly appropriate to have one with reference to Ceylon. That country affords a striking modern example of the greater ease of reducing death rates than birth rates in underdeveloped areas. Probably largely as a result of widespread spraying of mosquito-breeding areas with DDT, death rates have been sharply reduced in Ceylon during the past decade. Birth rates, in contrast, have remained at their high prewar levels and Ceylon has had a heavy increase in population. Dr. Ryan's article makes it clear that attitudes toward family size are deeply imbedded in the customs, mores, and values of a society. An understanding of these relationships is essential to any intelligent approach to problems of high fertility in agrarian areas.

THE RISK OF DISABILITY FOR PERSONS WITH CHRONIC DISEASE

JEAN DOWNES AND MARGUERITE KELLER¹

THE longitudinal observation of a population for purposes of studying disease and ill health in the group affords the opportunity to study the risk of disability over a period of time for persons with specific chronic conditions—a most important subject for consideration. This paper presents a description of disabling illness from chronic disease in a sample population observed from three to five years in the Eastern Health District of Baltimore.

Previous analyses have dealt with a description of some of the characteristics of the sample population studied, the prevalence and incidence of specific chronic conditions, and the method of statistical analysis which was applied to chronic conditions observed in this longitudinal study (1, 2, 3).

DATA AND METHOD OF STUDY

The data are cases of major chronic disease or conditions reported in a sample of families living in the Eastern Health District of Baltimore during the period June, 1938 to May, 1943. Briefly, the method of study was as follows: Families living in thirty-four city blocks were visited at monthly intervals to obtain a record of illness among their members. In seventeen of the thirty-four city blocks the families were visited over a period of five years; in the other seventeen, visiting was continued for only three years in families where no persons with chronic disease were reported during that period.

Careful inquiry was made concerning members of the family who were in institutions for the mentally ill, for the feeble-minded, and for other chronic conditions requiring institutional care.

The instructions for the use of the family visitors contained a list of the more common chronic diseases about which

¹ From the Milbank Memorial Fund.

special inquiry was to be made. This special information included date of onset of the first symptoms of the disease, their nature, the date first diagnosed, and whether the diagnosis was made by a private physician, at a clinic, or at a hospital. Illnesses that were reported as chronic were asked about on each subsequent visit to the family. Inquiry was made concerning the amount of discomfort and disability suffered from the condition since the last visit and the amount of medical care received for it.

The causes of chronic illness as reported by the family informants were submitted to the attending physicians for confirmation or correction. The cases which had clinic attendance and those which had hospital admissions were also checked against the records of the clinic or hospital where the service was given. The only exception to this procedure was for cases hospitalized outside the City of Baltimore.

In order to make the illness record more objective and thus increase the accuracy of information, a form was devised for recording on a calendar basis the onset and duration of cases of illness, the onset and duration of disability, the number of days confined to bed, and the number of days in the hospital.

Disability was defined as inability to pursue usual activity such as working, attending school, doing housework, or other usual activities.

The classification "major" chronic disease includes heart disease, hypertensive vascular disease or high blood pressure, arthritis, tuberculosis, diabetes, chronic nephritis, rheumatic fever, varicose veins, chronic gall-bladder disease, syphilis, malignant neoplasm, peptic ulcer, toxic goiter, epilepsy, mental deficiency, psychoses and psychoneuroses, and other important but relatively rare conditions, such as Parkinson's disease, cerebral palsy, and multiple sclerosis.

DESCRIPTION OF PERSONS WITH CHRONIC DISEASE

Certain characteristics of the persons who reported chronic illness during the study are of interest. A total of 1,480 diag-

DIAGNOSIS CLASS	NUMBER OF PERSONS ALL AGES	PER CENT					
		Age Group					
		Under 10	10-19	20-34	35-49	50-64	65+
Arthritis	267	0.0	1.2	7.5	28.7	41.3	21.3
Heart Disease	278	0.9	0.9	4.5	15.5	43.6	34.6
Hypertensive Vascular Disease and Arteriosclerosis	160	0.7	1.4	7.5	21.2	39.7	29.5
Psychoneurosis and Chronic Nervousness	113	2.8	10.2	31.5	29.6	23.1	2.8
Rheumatic Fever	103	18.5	43.3	19.6	12.4	3.1	3.1
Varicose Veins	65	0.0	0.0	9.5	38.1	38.1	14.3
Gall-Bladder Disease	55	0.0	0.0	11.1	46.3	33.3	9.3
Diabetes	49	0.0	0.0	4.6	16.3	53.5	25.6
Mental Deficiency	39	21.7	52.2	17.4	8.7	0.0	0.0
Psychosis	42	0.0	12.5	16.7	37.5	29.2	4.1
Tuberculosis	51	2.6	13.2	39.4	18.4	13.2	13.2
Syphilis	36	2.9	2.9	34.2	51.4	5.7	2.9
Neoplasm (Malignant)	48	2.4	0.0	2.4	14.7	41.5	39.0
Peptic Ulcer	26	0.0	0.0	45.8	37.5	16.7	0.0
Goiter (Toxic)	11	0.0	18.2	27.3	45.4	0.0	9.1
Other Chronic Diseases	137	7.7	5.2	16.4	25.0	29.3	16.4

Table 1. Age distribution of persons with specific chronic conditions. Eastern Health District of Baltimore, June, 1938-May, 1943.

noses of chronic illness was reported during the period of the study. Table 1 shows the age distribution of the cases in each diagnosis class. Cases of arthritis, heart disease, hypertensive vascular disease, and diabetes were concentrated largely in the middle and old-age groups. On the other hand, tuberculosis, syphilis, and peptic ulcer were reported as present chiefly among adults under 50 years of age. Cases of rheumatic fever were most frequent among persons under 20 years of age. Thus the data from this study are in agreement with the known age pattern of these diseases.

The coding of cases of chronic disease provided for their division into the following classes:

AMBULATORY

Class 1. These cases had no disability from the condition and no medical care for it during observation.

Class 2. These cases had no disability but did have medical care at some time during observation.

Class 3. These cases had one or more disabling episodes of illness from the chronic disease at some time during observation.

AMBULATORY BUT DISABLED FOR WORK
THROUGHOUT OBSERVATION

Class 4. These cases had no episodes of more severe disability, that is, no bed attacks during observation.

Class 5. These cases had one or more episodes of bed illness which were due to the particular chronic illness present.

NONAMBULATORY (BED CASES)

Class 6. These cases were confined to bed throughout observation. Cases in institutions for the tuberculous, for the feeble-minded, and for mental disorder were included in this class even though not all of their time was spent in bed.

The reason for these classifications was to obtain a population base for purposes of study of the risk of disability over a period of time among persons with a specific chronic condition. Persons in Classes 1, 2, and 3 afford that population.

Table 2 shows the distribution of the persons in specific diagnosis groups according to the classes just described. Cases in Classes 1 and 2 have been combined and cases in Classes 4 and 5 have been combined.

It is apparent from Table 2 that for the most part disabling chronic conditions formed a fairly high proportion of the total in each diagnosis class. Cases of heart disease, rheumatic fever, gall-bladder disease, psychosis, tuberculosis, and malignant neoplasm were outstanding in this respect. Also, it is apparent that cases permanently disabled, Classes 4, 5, and 6, formed a relatively small proportion of the total in each diagnosis category. The exceptions were cases of mental deficiency and psychosis.

In the study of illness in the Eastern Health District of Baltimore, from 60 to 70 per cent of the total illnesses reported as present in the family at the time of the first visit were those of a chronic nature. These were conditions which had their onset

prior to observation of the family and cannot be considered as incidence of illness within the period of observation. In a population observed over a period of time, illnesses of a chronic nature have a low incidence, that is, occurrence of newly-diagnosed cases in comparison with their prevalence at any given time during the period. For example, in this population the annual incidence of new diagnoses of "major" chronic illness was 23.6 per 1,000 person-years compared with a prevalence of 178 per 1,000 person-years.

The analysis of the incidence of disabling episodes of chronic

Table 2. Distribution of persons with specific chronic conditions according to their status during observation. Eastern Health District of Baltimore, June, 1938-May, 1943.

DIAGNOSIS CLASS	TOTAL PERSONS	AMBULATORY			Class 6
		Classes 1 and 2	Class 3	Classes 4 and 5	
		No Disability During Observation	Disability at Some Time During Observation	Disabled for Usual Occupation Throughout Observation	Non-ambulatory Bed Patients Throughout Observation
Per Cent					
ALL DIAGNOSES	1,480	32.9	47.2	5.8	4.1
Arthritis	267	55.8	40.0	3.0	1.2
Heart Disease	278	28.4	60.1	6.5	5.0
Hypertensive Vascular Disease and Arteriosclerosis	160	55.0	38.8	5.0	1.2
Psychoneurosis and Chronic Nervousness	113	55.7	40.7	2.7	0.9
Rheumatic Fever	103	27.2	67.0	2.9	2.9
Varicose Veins	65	56.9	40.0	3.1	0.0
Gall-Bladder Disease	55	30.9	67.3	0.0	1.8
Diabetes	49	57.2	30.6	10.2	2.0
Mental Deficiency	39	53.9	5.1	28.2	12.8
Psychosis	42	14.3	42.8	14.3	28.6
Tuberculosis	51	14.7	60.8	13.7	11.8
Syphilis	36	75.0	22.2	2.8	0.0
Neoplasm (Malignant)	48	8.3	77.1	6.3	8.3
Peptic Ulcer	26	34.6	57.7	7.7	0.0
Goiter (Toxic)	11	27.3	72.7	0.0	0.0
Other Chronic Diseases ¹	137	49.7	37.1	6.6	6.6

¹"Other chronic diseases" includes persons with hernia, urinary calculi, uncomplicated chronic nephritis, prostatitis, pernicious anemia, aplastic anemia, osteomyelitis, Parkinson's disease, epilepsy and multiple sclerosis. In each instance these chronic conditions involved too few numbers to deal with them separately.

disease includes both the cases present in the population at the time of first observation and those where the first diagnosis of the condition was made while the person affected was under observation. Cases in Classes 4, 5, and 6 are excluded from certain parts of the analysis because they were permanently disabled throughout observation and thus were not at risk of disabling episodes of illness.

Fatal cases not reported until just before or after death occurred are also excluded. There were twenty-six instances of sudden death from heart disease, six from hypertensive vascular disease, and two cases of malignant neoplasm which were not reported until one or two days before death occurred.

Disabling episodes of chronic illness may be considered to

Table 3. Number of persons at risk of disabling episodes of specified chronic conditions and the mean number of years they were observed. Eastern Health District of Baltimore, June, 1938-May, 1943.

DIAGNOSIS CLASS	NUMBER OF PERSONS AT RISK OF DISABLING ATTACKS ¹	NUMBER OF PERSON-YEARS OF OBSERVATION OF THE CHRONIC CONDITION	MEAN NUMBER OF PERSON-YEARS OBSERVED
ALL DIAGNOSES	1,299	3,219.0	2.5
Arthritis	256	734.5	2.9
Heart Disease	220	506.5	2.3
Hypertensive Vascular Disease and Arteriosclerosis	144	340.0	2.4
Psychoneurosis and Chronic Nervousness	109	262.0	2.4
Rheumatic Fever	97	233.5	2.4
Varicose Veins	63	193.5	3.1
Gall-Bladder Disease	54	145.0	2.7
Diabetes	43	115.5	2.7
Mental Deficiency	23	80.0	3.5
Psychosis	24	44.5	1.9
Tuberculosis	38	43.5	1.1
Syphilis	35	74.5	2.1
Neoplasm (Malignant)	39	39.5	1.0
Peptic Ulcer	24	54.5	2.3
Goiter (Toxic)	11	35.5	3.2
Other Chronic Diseases	119	316.5	2.7

¹One hundred and forty-seven persons who were disabled throughout observation are excluded. Also, twenty-six cases of sudden death from heart disease, six from hypertensive vascular disease and two cases of malignant neoplasm are excluded.

mean a worsening of the specific condition. These episodes may be temporary with subsequent recovery from disability or a last disabling episode may result in permanent disability. Rheumatic fever may be cited as an example of an illness which may have acute exacerbations at intervals over a period of time. Also, a diabetic may develop a complication such as diabetic ulcer or gangrene which will disable the patient until this specific condition is rectified.

There were two criteria used to determine the classification "became permanently disabled." (1) The case must have been free of disability at some time during observation. (2) The last disabling episode must have lasted for twelve months or longer at the time of termination of observation of the case. Obviously, there is a weakness in the second of the two criteria. It is possible that a person disabled twelve months or longer at the termination of his observation may at some later period recover from his disability. So the classification "became permanently disabled" must be interpreted within the limitations of the study.

Disabling episodes of chronic illness as presented in this analysis do not give a measure of the progression of the specific chronic condition over a period of time. However, the rate at which "permanent disability" occurs may be considered as some indication of progression.

Table 3 shows the mean number of person-years of observation of the chronic condition among the 1,299 persons at risk of disabling episodes. The mean years of observation was lowest for cases of malignant neoplasm and for tuberculosis, one year in both instances. The highest mean years of observation, three or slightly more, were for cases of varicose veins, mental deficiency, and toxic goiter.

Before consideration of the incidence of disabling episodes, it is of interest to see the distribution of persons who had such episodes according to their frequency. These data are shown in Table 4 and Appendix Table 1. Persons who had only one disabling episode during observation of the chronic illness were

DIAGNOSIS CLASS	TOTAL PERSONS	NUMBER OF DISABLING EPISODES							
		1	2	3	4	5	6	7	8+
ALL DIAGNOSES	100.0	65.2	19.2	8.7	3.2	1.7	0.6	0.5	0.9
Arthritis	100.0	71.0	21.5	4.7	1.9	0.0	0.9	0.0	0.0
Heart Disease	100.0	57.4	17.8	12.8	7.8	2.8	0.7	0.7	0.0
Hypertensive Vascular Disease and Arteriosclerosis	100.0	75.0	19.6	5.4	0.0	0.0	0.0	0.0	0.0
Psychoneurosis and Chronic Nervousness	100.0	71.7	10.9	8.7	4.3	2.2	0.0	0.0	2.2
Rheumatic Fever	100.0	53.6	29.0	11.6	4.4	0.0	0.0	0.0	1.4
Varicose Veins	100.0	80.8	15.4	3.8	0.0	0.0	0.0	0.0	0.0
Gall-Bladder Disease	100.0	56.8	24.3	10.8	0.0	5.4	0.0	0.0	2.7
Diabetes	100.0	73.3	6.7	20.0	0.0	0.0	0.0	0.0	0.0
Psychosis	100.0	72.2	11.1	5.6	0.0	11.1	0.0	0.0	0.0
Tuberculosis	100.0	77.4	19.4	0.0	0.0	0.0	3.2	0.0	0.0
Syphilis	100.0	75.0	12.5	12.5	0.0	0.0	0.0	0.0	0.0
Neoplasm (Malignant)	100.0	65.7	22.9	8.6	0.0	0.0	2.8	0.0	0.0
Peptic Ulcer	100.0	40.0	13.3	13.3	20.0	6.7	0.0	6.7	0.0
Goiter (Toxic)	100.0	50.0	25.0	0.0	0.0	12.5	0.0	0.0	12.5
Other Chronic Diseases	100.0	66.7	15.7	9.8	1.9	0.0	1.9	0.0	4.0

Table 4. Percentage distribution of persons who had disabling episodes of specific chronic illness according to the frequency of these episodes. Eastern Health District of Baltimore, June, 1938-May, 1943.

most frequent. Heart disease was outstanding because 42 per cent of the persons having such illness had two or more attacks during their observation. There were only sixteen persons who had peptic ulcer, however, nine had two or more periods of disability because of this condition.

Persons having eight or more disabling episodes of chronic illness represent the extremes. In the diagnostic category psychoneurosis and chronic nervousness, one person had ten periods of disability; one person who had rheumatic fever had nine episodes of disability; one person with chronic gall-bladder disease had forty-two periods of disability; and one person with toxic goiter had thirty-three periods of disability. There were two persons in the category "other chronic diseases" who had eight or more disabling episodes of chronic illness; one had nine, and the other, a person with aplastic anemia, had fourteen disabling episodes from this condition.

The duration of disabling episodes of specific chronic conditions is of interest because there are differences among them

DIAGNOSIS CLASS	NUMBER OF EPISODES	DURATION OF DISABLING EPISODES					
		One Day Only	2-7 Days	8-31 Days	1-2 Months	3-6 Months	7+ Months
		Per Cent					
Arthritis	151	6.0	31.1	25.2	21.2	9.9	6.6
Heart Disease	262	11.3	26.4	22.6	14.0	18.2	7.5
Hypertensive Vascular Disease and Arteriosclerosis	73	9.6	23.3	30.2	17.8	9.6	9.5
Psychoneurosis and Chronic Nervousness	78	16.5	41.7	8.9	13.9	15.2	3.8
Rheumatic Fever	122	9.3	17.0	25.3	11.9	24.6	11.9
Varicose Veins	32	0.0	28.0	46.9	9.4	9.4	6.3
Gall Bladder Disease	103	44.1	36.2	9.8	5.9	3.0	1.0
Diabetes	22	0.0	31.9	36.3	13.6	9.1	9.1
Psychosis	30	9.6	29.0	16.2	22.6	16.1	6.5
Tuberculosis	42	4.9	7.3	19.6	17.1	29.1	22.0
Syphilis	11	40.0	10.0	10.0	30.0	0.0	10.0
Neoplasm (Malignant)	55	3.5	17.5	17.5	31.6	21.1	8.8
Peptic Ulcer	40	15.0	42.5	17.5	10.0	12.5	2.5
Goiter (Toxic)	46	15.2	63.1	6.5	6.5	6.5	2.2
Other Chronic Diseases	98	15.3	18.4	23.4	21.4	15.3	6.2

Table 5. Distribution of disabling episodes from specific chronic conditions according to their duration. Eastern Health District of Baltimore, June, 1938-May, 1943.

which reflect the severity of the chronic condition. Table 5 shows for each chronic condition the distribution of the disabling episodes according to their duration. A duration of disability lasting more than one month may be taken as an indication of severity of the condition. Malignant neoplasm and tuberculosis were outstanding in that from 62 to 68 per cent of the disabling episodes lasted more than a month. At the other extreme, only 10 per cent of the disabling episodes from gall-bladder disease and 15 per cent of the episodes because of toxic goiter were of long duration. Both of these conditions were noteworthy because about 80 per cent of the disabling episodes among these cases did not last longer than a week. From 38 to 48 per cent of the episodes due to arthritis, heart disease, hypertensive vascular disease, rheumatic fever, psychosis, and "all other chronic conditions" had a duration of more than one month.

The data which have been presented afford a description of

the persons in each category of chronic illness, by age, by type of case, that is, disabling or not, and by frequency and duration of disabling attacks.

INCIDENCE OF DISABLING EPISODES FROM CHRONIC DISEASE AMONG MALES AND FEMALES

The annual incidence of disabling episodes of specific chronic illnesses among males and females is shown in Table 6. Here the denominator includes the total person-years of observation for each sex group. However, the person-years of observation of persons who were permanently disabled throughout observation are excluded. For all diagnoses combined, the rate among females was 75 per cent above that among males. Females had higher rates of disability than males for each specific chronic

Table 6. Annual incidence of disabling episodes of specific chronic illnesses in the sample population. Eastern Health District of Baltimore, June, 1938-May, 1943.¹

DIAGNOSIS CLASS	RATE OF DISABLING EPISODES PER 1,000 POPULATION ²		NUMBER OF DISABLING ATTACKS	
	Males	Females	Males	Females
ALL DIAGNOSES	41.4	71.8	418	749
Arthritis	5.9	8.7	60	91
Heart Disease	10.1	15.3	102	160
Hypertensive Vascular Disease and Arteriosclerosis	2.4	4.7	24	49
Psychoneurosis and Chronic Nervousness	2.1	5.5	21	57
Rheumatic Fever	4.2	7.7	42	80
Varicose Veins	1.0	2.1	10	22
Gall-Bladder Disease	0.1	9.8	1	102
Diabetes	1.1	1.1	11	11
Mental Deficiency	0.2	0.0	2	0
Psychosis	1.1	1.8	11	19
Tuberculosis	1.7	2.4	17	25
Syphilis	0.5	0.6	5	6
Neoplasm (Malignant)	2.1	3.3	21	34
Peptic Ulcer	3.8	0.2	38	2
Goiter (Toxic)	0.2	4.2	2	44
Other Chronic Diseases	5.1	4.5	51	47

¹Cases permanently disabled are excluded, that is, their person-years are excluded.

²The population includes—Males, 10,095 person-years; females, 10,429 person-years.

condition with the exception of peptic ulcer and the cases classed as "other chronic diseases."

Another way of presentation of the incidence of disabling episodes of chronic illness is to use as the denominator the person-years of those with chronic disease who were at special risk. These data are shown in Table 7 and Appendix Table 2. The rates for males and females were similar for all diagnoses combined. The ratios of the rates of males to females shown in Column 3 indicate that males had a greater risk of disability than did females for certain chronic conditions, namely, arthritis, hypertensive vascular disease, and arteriosclerosis, varicose veins, diabetes, psychosis, and malignant neoplasm.

From Tables 6 and 7 it is apparent that when the total observed population forms the denominator, females had a much higher incidence of disabling episodes of chronic illness than did males. However, when the person-years of observation of the

Table 7. Annual incidence of disabling episodes of specific chronic illness among males and females at special risk because of the presence of chronic disease. Eastern Health District of Baltimore, June, 1938-May, 1943.

DIAGNOSIS CLASS	RATE OF DISABLING ATTACKS PER 1,000 PERSONS AT RISK		RATIO MALES FEMALES
	Males	Females	
ALL DIAGNOSES	368.0	359.6	1.02
Arthritis	275.0	176.4	1.56
Heart Disease	568.2	489.3	1.16
Hypertensive Vascular Disease and Arteriosclerosis	246.2	202.1	1.22
Psychoneurosis and Chronic Nervousness	304.3	295.3	1.03
Rheumatic Fever	405.8	615.4	0.66
Varicose Veins	487.8	127.2	3.83
Gall-Bladder Disease	80.0	769.8	0.10
Diabetes	323.5	135.0	2.40
Mental Deficiency	40.8	0.0	
Psychosis	880.0	593.8	1.48
Tuberculosis	1,000.0	943.4	1.06
Syphilis	137.0	157.9	0.87
Neoplasm (Malignant)	1,680.0	1,259.3	1.33
Peptic Ulcer	737.9	666.7	1.11
Goiter (Toxic)	307.7	1,517.2	0.20
Other Chronic Diseases	236.7	465.3	0.51

reported cases of chronic disease form the population base the relationship of the sexes for certain diagnostic categories is reversed. This suggests that generally males suffer more severely from certain specific chronic diseases than do females. This fact is further illustrated by consideration of those in the population who were permanently disabled.

Table 8 shows the incidence of disabling episodes of chronic illness and the prevalence of cases permanently disabled among males and females. All cases considered as permanently disabled were disabled when first observed and remained so throughout their observation.² It is noteworthy that the preva-

Table 8. Incidence of disabling episodes of specific chronic illness and prevalence of persons permanently disabled at time of first observation. Eastern Health District of Baltimore, June, 1938-May, 1943.

DIAGNOSIS CLASS	MALES			FEMALES		
	Disabling Episodes ¹	Prevalence of Persons Permanently Disabled ²	Total	Disabling Episodes ¹	Prevalence of Persons Permanently Disabled ²	Total
Annual Rate Per 1,000 Population						
ALL DIAGNOSES	41.6	21.7	63.3	71.9	14.0	85.9
Arthritis	5.9	2.1	8.0	8.7	0.8	9.5
Heart Disease	10.1	4.5	14.6	15.3	2.7	18.0
Hypertensive Vascular Disease and Arteriosclerosis	2.4	1.1	3.5	4.7	0.9	5.6
Psychoneurosis and Chronic Nervousness	2.1	1.0	3.1	5.5	0.0	5.5
Rheumatic Fever	4.2	0.7	4.9	7.7	0.6	8.3
Varicose Veins	1.0	0.3	1.3	2.1	0.1	2.2
Gall-Bladder Disease	0.1	0.0	0.1	9.8	0.1	9.9
Diabetes	1.1	0.5	1.6	1.1	1.4	2.5
Mental Deficiency	0.2	2.7	2.9	0.0	2.9	2.9
Psychosis	1.1	3.5	4.6	1.8	1.8	3.6
Tuberculosis	1.7	2.0	3.7	2.4	0.9	3.3
Syphilis	0.5	0.0	0.5	0.6	0.2	0.8
Neoplasm (Malignant)	2.1	0.4	2.5	3.3	0.3	3.6
Peptic Ulcer	3.8	0.5	4.3	0.2	0.0	0.2
Goiter (Toxic)	0.2	0.0	0.2	4.2	0.0	4.2
Other Chronic Diseases	5.1	2.4	7.5	4.5	1.3	5.8

¹Males—10,095 person-years, females—10,429 person-years.

²Males—10,282 person-years, females—10,550 person-years.

² Persons permanently disabled are counted in each year in which they were observed.

lence of these cases, 22 per 1,000 person-years among males, was considerably above the rate, 14 per 1,000 person-years among females. The prevalence of heart disease, psychosis, and tuberculosis was higher among males than among females.

The total columns, Columns 3 and 6 in Table 8, indicate the total amount of disabling illness for males and females, respectively, in the total population. Because females have a considerably higher attack rate of disabling episodes from chronic disease than males, their total disabling illness rate is higher than that of males.

It is of interest to learn the rate at which persons with chronic disease became permanently disabled during observa-

Table 9. Prevalence of persons permanently disabled and incidence of permanent disability of chronic disease among males and females. Eastern Health District of Baltimore, June, 1938-May, 1943.

DIAGNOSIS CLASS	MALES			FEMALES		
	Prevalence of Persons Permanently Disabled ¹	Incidence of Permanent Disability ²	Total	Prevalence of Persons Permanently Disabled ¹	Incidence of Permanent Disability ²	Total
	Annual Rate Per 1,000 Population					
ALL DIAGNOSES	21.7	2.3	24.0	14.0	1.5	15.5
Arthritis	2.1	0.1	2.2	0.8	0.2	1.1
Heart Disease	4.5	0.8	5.3	2.7	0.6	3.3
Hypertensive Vascular Disease and Arteriosclerosis	1.1	0.3	1.4	0.9	0.2	1.1
Psychoneurosis and Chronic Nervousness	1.0	0.1	1.1	0.0	0.0	0.0
Rheumatic Fever	0.7	0.2	0.9	0.6	0.0	0.6
Varicose Veins	0.3	0.0	0.3	0.1	0.0	0.1
Gall-Bladder Disease	0.0	0.0	0.0	0.1	0.0	0.1
Diabetes	0.5	0.1	0.6	1.4	0.0	1.4
Mental Deficiency	2.7	0.1	2.8	2.9	0.0	2.9
Psychosis	3.5	0.0	3.5	1.8	0.1	1.9
Tuberculosis	2.0	0.4	2.4	0.9	0.4	1.3
Syphilis	0.0	0.0	0.0	0.2	0.0	0.2
Neoplasm (Malignant)	0.4	0.0	0.4	0.3	0.0	0.3
Peptic Ulcer	0.5	0.0	0.5	0.0	0.0	0.0
Goiter (Toxic)	0.0	0.0	0.0	0.0	0.0	0.0
Other Chronic Diseases	2.4	0.2	2.6	1.3	0.0	1.3

¹Rates are based upon total person-years: males, 10,282 person-years; females, 10,550 person-years.

²Rates are based upon total person-years minus those for cases disabled throughout observation: males, 10,095 person-years; females, 10,429 person-years.

tion. Table 9 and Appendix Table 3 shows these data for males and females. Columns 1 and 4 show the prevalence of persons permanently disabled. Columns 2 and 5 show the annual incidence of cases which became permanently disabled for each of the sexes. It should be stressed that cases which became permanently disabled while being observed arose only among those persons who were at risk of disabling episodes.

Males had a higher incidence of permanent disability than did females; their rate for all diagnoses of chronic disease was 2.3 compared with 1.5 per 1,000 person-years among females.³ Columns 3 and 6 in Table 8 show the total amount of permanent disability for males and females respectively. Here again, males had an excess rate over that for females. Their rate was 24 per 1,000 person-years compared with 16 per 1,000 person-

Table 10. Disabling days of specific chronic illness per person year of observation at risk. Eastern Health District of Baltimore, June 1938-May, 1943.¹

DIAGNOSIS CLASS	DISABLING DAYS PER PERSON-YEAR AT RISK		RATIO
	Males	Females	MALES FEMALES
ALL DIAGNOSES	23.4	17.0	1.38
Arthritis	20.5	5.6	3.66
Heart Disease	30.4	27.0	1.13
Hypertensive Vascular Disease and Arteriosclerosis	16.6	7.6	2.18
Psychoneurosis and Chronic Nervousness	12.9	11.3	1.14
Rheumatic Fever	37.5	50.6	0.74
Varicose Veins	20.7	7.1	2.92
Gall-Bladder Disease	2.6	9.7	0.27
Diabetes	24.4	3.3	7.39
Psychosis	50.2	36.1	1.39
Tuberculosis	159.9	103.5	1.54
Syphilis	13.6	1.0	13.60
Neoplasm (Malignant)	94.8	90.1	1.05
Peptic Ulcer	20.1	44.0	0.46
Goiter (Toxic)	14.5	34.4	0.42
Other Chronic Diseases	11.5	27.0	0.43

¹ Cases permanently disabled at first observation are excluded.

³ The difference between these rates for males and females was not statistically significant.

years among females. The difference between these rates is highly significant.*

Table 10 shows the disabling days due to specific chronic illnesses per person-years of observation at risk of such disability among males and females. Column 3 of the table which shows the ratio of the mean days per year for males to that for females indicates that for a number of chronic conditions males suffered considerably more disability in terms of days than did females. The most outstanding classes of chronic illness in this respect were arthritis, hypertensive vascular disease, and arteriosclerosis, varicose veins, diabetes, and syphilis. Disabled days per year from tuberculosis and from psychosis also showed a considerable excess among males compared with those among females.

The differences between the sexes with respect to specific chronic conditions are difficult to interpret. The data certainly indicate a greater severity of illness, judged by disability, among males than among females. It may be argued that these results are a reflection of earlier diagnosis of chronic conditions among females than among males, that is, at the time of first diagnosis of heart disease among males, on the average, the disease may have reached a more advanced stage than was true of first diagnosis of the same type of heart disease among females.

Females, because of childbearing and other female genital conditions, have more medical care than do males. For example, in the study of medical care for all acute illnesses in the sample population of the Eastern Health District, at ages 15-34 the rate of medical calls was 80 per cent higher among females than among males; at ages 35-54 the excess among females was 32 per cent. These excesses were due entirely to confinements and other female genital causes (4). It seems reason-

* The significance of the difference between the two rates was tested by application of the following formula:

$$\sigma_d = \sqrt{PQ \left(\frac{1}{n_1} + \frac{1}{n_2} \right)}$$

able to conclude that more females than males had opportunities for early detection and diagnosis of chronic conditions because of more frequent medical care. However, from the data on chronic disease in the present analysis, it is impossible to classify most of the cases according to early or late diagnosis.

THE RISK OF DISABILITY IN SUCCESSIVE YEARS OF OBSERVATION OF CHRONIC CASES

To study the risk of disability in successive years of observation it is necessary to divide the cases of specific chronic illnesses into two classes: (1) those persons with a first diagnosis of chronic disease while being observed for all illness, and (2) those persons whose first diagnosis of chronic disease had been made prior to their observation in the sample population.

The questions to be answered are (1) what is the probability of one or more disabling episodes among persons in successive years after a first diagnosis of a chronic condition has been made, and (2) what is the probability of one or more disabling episodes in successive years after first observation among persons whose first diagnosis was made prior to their observation? The modified life-table method first used by Frost has been adapted for the purposes of this analysis (5).

The following formula was used:

$$Q_x = \frac{a_x}{1_x - (\frac{1}{2} w_x + \frac{1}{2} d_x + r_x)}$$

The meaning of the symbols is as follows:

a_x = the number who had some disability during the year

1_x = the number present at the beginning of the year

w_x = the number withdrawn living at the beginning of the year

d_x = the number dying during the year

r_x = the number classed as permanently disabled at the beginning of the year

Those who recovered from disability and were again at risk are included in 1_x .

It should be stressed that data concerning the number dying

during the year cannot be interpreted as fatality rates from a specific chronic condition—Appendix Tables 6 and 7-B. For example, a person with arthritis may have died of heart disease or from an accidental injury.

Tables 11 and 12 show the risk of disability for males and females with a specific diagnosis of chronic disease. The data are shown separately for those with a first diagnosis, "new cases," during their observation in the morbidity study and for those who had a chronic condition when first observed, that is, "old cases." The years of observation shown in the tables are years of the case, that is, they are not study years nor are they calendar years. The data upon which these tables are based are shown in Appendix Tables 5, 6, and 7-A, and B.

Table 11 shows the risk of disability for males and females with arthritis, heart disease, hypertensive vascular disease and arteriosclerosis, and psychoneurosis and chronic nervousness. Males with a first diagnosis of arthritis during observation had a considerably greater risk of suffering some disability during the twelve-month period after the diagnosis than did those classed as old cases. Fifty-two out of 100 in the former group were disabled compared with twenty-five out of 100 in the latter group. After the first year the rate among newly-diagnosed cases declined sharply to the general level maintained through four successive years by the old cases. In every disease category new cases suffered their highest rates of disability in the first year after diagnosis. Each showed a marked decline in risk of disability after the first year when the rates reached the same general level as those maintained by the old cases.

Females with a first diagnosis of the conditions shown in Table 11 were similar to the males in that the risk of disability was greatest in the first year after diagnosis, then declined to the general level of risk of all old cases.

These data indicate a close relationship between disability and a first diagnosis of a specific chronic condition, that is, a diagnosis may be brought about because of disability. Heart disease illustrates this fact most clearly. For example, almost

100 per cent of the new cases among males suffered some disability during the first year after the diagnosis was made. It must be emphasized that in this type of analysis a person can be counted as disabled only once during a given year. The number of episodes are not considered, just the fact that the person suffered some disability during a given year.

A comparison of the disabling rates during the first year for new cases among males with those among females indicates a

Table 11. Rate of disabling cases among males and females in successive years after observation of the case. Eastern Health District of Baltimore, June, 1938-May, 1943.

YEAR OF OBSERVATION OF CASE	MALES		FEMALES	
	New Cases (First Diagnosis During Obser- vation)	Old Cases (Onset Prior to Observation)	New Cases (First Diagnosis During Obser- vation)	Old Cases (Onset Prior to Observation)
Rate of Disabling Cases Per 100 Population at Risk				
ARTHRITIS				
1	51.9	25.0	34.7	19.1
2	18.6	15.6	7.2	11.4
3	20.7	25.8	3.8	13.0
4	0.0	24.2	0.0	1.9
5	0.0	7.1	0.0	13.1
HEART DISEASE				
1	96.9	30.2	59.1	49.1
2	45.7	23.9	28.6	30.5
3	15.4	25.5	14.3	22.7
4	66.7	42.9	0.0	27.3
5		22.2	0.0	29.4
HYPERTENSIVE VASCULAR DISEASE AND ARTERIOSCLEROSIS				
1	45.7	26.7	37.2	18.8
2	10.0	20.0	17.9	11.6
3	11.8	10.0	0.0	7.1
4	0.0	22.2	0.0	0.0
5	0.0	0.0	40.0	8.0
PSYCHONEUROSIS AND CHRONIC NERVOUSNESS				
1	62.5	20.5	60.0	19.8
2	15.4	12.9	11.3	7.0
3	0.0	8.3	24.2	15.4
4	0.0	0.0	10.5	0.0
5	0.0	0.0	20.0	0.0

generally greater risk of disability for males than for females. Arthritis and heart disease show the most marked differences between the sexes; the male rates for these diseases were 15 and 16 per cent above the rates among females. Cases of psychoneurosis and chronic nervousness with some disability during the first year after diagnosis produced similar rates among males and females.

Table 12 will not be discussed in detail. In some diagnosis

Table 12. Rate of disabling cases among males and females in successive years after observation of the case. Eastern Health District of Baltimore, June, 1938-May, 1943.

YEAR OF OBSERVATION OF CASE	MALES		FEMALES	
	New Cases (First Diagnosis During Observa- tion)	Old Cases (Onset Prior to Observation)	New Cases (First Diagnosis During Observa- tion)	Old Cases (Onset Prior to Observation)
Rate of Disabling Cases Per 100 Population at Risk				
RHEUMATIC FEVER				
1	88.9	32.0	100.0	59.7
2	12.5	20.5	14.3	32.3
3	0.0	16.7	66.7	16.3
4	0.0	50.0	0.0	25.0
5	0.0	15.4	0.0	0.0
VARICOSE VEINS				
1	100.0	0.0	57.1	19.1
2	50.0	0.0	0.0	7.1
3		33.3	0.0	0.0
4		40.0	0.0	5.6
5		50.0		6.5
GALL-BLADDER DISEASE				
1	50.0	0.0	59.5	55.1
2	0.0	0.0	26.1	23.3
3	0.0	0.0	14.3	27.8
4	0.0		0.0	0.0
5	0.0		0.0	31.6
DIABETES				
1	66.7	13.0	40.0	57.1
2	33.3	5.9	0.0	0.0
3	0.0	14.3	0.0	0.0
4		0.0	100.0	40.0
5		0.0		0.0

categories the data are based upon such small numbers that they do not permit interpretation. However, rheumatic fever follows quite closely the pattern of heart disease shown in Table 11.

This analysis showing the risk of having disability in successive years after observation has been presented in order to demonstrate a particular method of study of the various chronic diseases. This method if applied to a large enough universe of cases of specific chronic diseases can answer questions which are of great interest to those in public health and to those administering medical-care programs. Furthermore, the analysis has indicated that a cross-section of cases with a diagnosis made prior to first observation differs from those whose first diagnosis was made during observation. Therefore, a distinction must be made between those with their onset prior to observation and those whose observation starts with their first diagnosis of chronic disease.

SUMMARY

The data presented afford a description of the persons in a sample population of the Eastern Health District of Baltimore who have a specific chronic disease. Persons are shown by age, by type of case, that is, disabling or not, and by frequency and duration of disabling episodes of illness.

The annual incidence of disabling episodes of specific chronic conditions based upon the total sample population indicated that females had a rate considerably higher than among males. However, when disabling episodes were related to the particular population at special risk of such episodes, that is, the cases themselves, males had a greater risk of disability than did females for certain chronic conditions, namely, arthritis, heart disease, hypertensive vascular disease and arteriosclerosis, varicose veins, diabetes, psychosis, and malignant neoplasm.

The prevalence of persons who were considered as permanently disabled was higher among males than among females. The rates were 22 per 1,000 person-years among males compared

with 14 per 1,000 females. The rate at which persons became permanently disabled during observation was also higher among males than among females. When the total amount of permanent disability among males and females was considered, the difference between the sexes proved to be highly significant statistically.

Males also suffered considerably more disability in terms of days disabled than did females. The most outstanding classes of chronic illness in this respect were arthritis, hypertensive vascular disease and arteriosclerosis, varicose veins, diabetes, and syphilis.

An analysis showing the risk of disability in successive years after observation of the case is presented in order to demonstrate a particular method of study of the various chronic diseases. Cases are subdivided into (1) those where a first diagnosis of the chronic disease was made while the person was under observation for all illness; and (2) those whose diagnosis was made prior to their observation in the morbidity study.

There was found to be a close relationship between the risk of disability and a first diagnosis of a specific chronic disease. For example, almost 100 per cent of the new cases of heart disease among males suffered some disability during their first year of observation after diagnosis. In later years the risk of disability was considerably less. In every disease category new cases suffered their highest risk of disability in the first year after diagnosis.

The risk of disability for cases where the diagnosis was made prior to their observation in the morbidity study was fairly similar over the period of five successive years. This was true of arthritis, heart disease, hypertensive vascular disease and arteriosclerosis, psychoneurosis and chronic nervousness, and rheumatic fever.

The experience of females with a first diagnosis of chronic disease was similar to that among males in that the risk of disability was greatest in the first year after diagnosis, then declined to the general level of the rates for all old cases.

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Appendix Table 1. Distribution of persons who had disabling episodes of specific chronic illness, according to the frequency of these episodes. Eastern Health District of Baltimore, June, 1938-May, 1943.¹

DIAGNOSIS CLASS	TOTAL PERSONS	NUMBER OF DISABLING EPISODES								TOTAL EPISODES
		1	2	3	4	5	6	7	8+	
ALL DIAGNOSES	663	432	127	58	22	11	4	3	6	1,165
Arthritis	107	76	23	5	2	0	1	0	0	151
Heart Disease	141	81	25	18	11	4	1	1	0	262
Hypertensive Vascular Disease and Arteriosclerosis	56	42	11	3	0	0	0	0	0	73
Psychoneurosis and Chronic Nervousness	46	33	5	4	2	1	0	0	a	78
Rheumatic Fever	69	37	20	8	3	0	0	0	b	122
Varicose Veins	26	21	4	1	0	0	0	0	0	32
Gall-Bladder Disease	37	21	9	4	0	2	0	0	c	103
Diabetes	15	11	1	3	0	0	0	0	0	22
Psychosis	18	13	2	1	0	2	0	0	0	30
Tuberculosis	31	24	6	0	0	0	1	0	0	42
Syphilis	8	6	1	1	0	0	0	0	0	11
Neoplasm (Malignant)	35	23	8	3	0	0	0	1	0	55
Peptic Ulcer	15	6	2	2	3	1	0	1	0	40
Goiter (Toxic)	8	4	2	0	0	1	0	0	d	46
Other Chronic Diseases	51	34	8	5	1	0	1	0	e	98

¹Twenty-six "sudden deaths" from heart disease and six from hypertensive vascular disease are excluded. Also, two cases of cancer not reported until just prior to death are excluded.

- a One person had 10 disabling episodes.
- b One person had 9 disabling episodes.
- c One person had 42 disabling episodes.
- d One person had 33 disabling episodes.
- e One person had 9 disabling episodes.
- f One person had 14 disabling episodes.

Appendix Table 2. Persons-years at risk of disabling episodes of specific chronic illnesses. Eastern Health District of Baltimore, June, 1938-May, 1943.

DIAGNOSIS CLASS	PERSON-YEARS AT RISK	
	Males	Females
ALL DIAGNOSES	1,136.0	2,083.0
Arthritis	218.5	516.0
Heart Disease	179.5	327.0
Hypertensive Vascular Disease and Arteriosclerosis	97.5	242.5
Psychoneurosis and Chronic Nervousness	69.0	193.0
Rheumatic Fever	103.5	130.0
Varicose Veins	20.5	173.0
Gall-Bladder Disease	12.5	132.5
Diabetes	34.0	81.5
Psychosis	12.5	32.0
Tuberculosis	17.0	26.5
Syphilis	36.5	38.0
Neoplasm (Malignant)	12.5	27.0
Peptic Ulcer	51.5	3.0
Goiter (Toxic)	6.5	29.0
Other Chronic Diseases	215.5	101.0

Appendix Table 3. Number of persons who were permanently disabled at the time of first observation and the number who became permanently disabled during observation. Eastern Health District of Baltimore, June, 1938-May, 1943.

DIAGNOSIS CLASS	NUMBER OF PERSONS WITH PERMANENT DISABILITY—ONSET OF ILLNESS PRIOR TO OBSERVATION (COUNTED IN EACH YEAR IN WHICH THEY WERE OBSERVED)		NUMBER OF PERSONS WHO BECAME PERMANENTLY DISABLED DURING OBSERVATION	
	Males	Females	Males	Females
ALL DIAGNOSES	223	148	23	16
Arthritis	22	8	1	3
Heart Disease	46	29	8	6
Hypertensive Vascular Disease and Arteriosclerosis	11	9	3	2
Psychoneurosis and Chronic Nervousness	10	0	1	0
Rheumatic Fever	7	6	2	0
Varicose Veins	3	1	0	0
Gall-Bladder Disease	0	1	0	0
Diabetes	5	15	1	0
Mental Deficiency	28	31	1	0
Psychosis	36	19	0	1
Tuberculosis	21	10	4	4
Syphilis	0	2	0	0
Neoplasm (Malignant)	4	3	0	0
Peptic Ulcer	5	0	0	0
Goiter (Toxic)	0	0	0	0
Other Chronic Diseases	25	14	2	0

Appendix Table 4. Person-years at risk and number of days of disability of chronic disease among males and females. Eastern Health District of Baltimore, June, 1938-May, 1943.¹

DIAGNOSIS CLASS	PERSON-YEARS AT RISK		DISABLING DAYS	
	Males	Females	Males	Females
ALL DIAGNOSES	1,136.0	2,083.0	26,597	35,339
Arthritis	218.5	516.0	4,469	2,904
Heart Disease	179.5	327.0	5,460	8,836
Hypertensive Vascular Disease and Arteriosclerosis	97.5	242.5	1,615	1,848
Psychoneurosis and Chronic Nervousness	69.0	193.0	888	2,173
Rheumatic Fever	103.5	130.0	3,879	6,582
Varicose Veins	20.5	173.0	424	1,220
Gall-Bladder Disease	12.5	132.5	32	1,279
Diabetes	34.0	81.5	831	266
Mental Deficiency	49.0	31.0	367	0
Psychosis	12.5	32.0	627	1,156
Tuberculosis	17.0	26.5	2,719	2,742
Syphilis	36.5	38.0	496	38
Neoplasm (Malignant)	12.5	27.0	1,185	2,434
Peptic Ulcer	51.5	3.0	1,033	132
Goiter (Toxic)	6.5	29.0	94	997
Other Chronic Diseases	215.5	101.0	2,478	2,732

¹Cases permanently disabled when first observed are excluded.

YEAR OF OBSER- VATION	MALES				FEMALES			
	New (1st Diagnosis)		Old (Onset Prior)		New (1st Diagnosis)		Old (Onset Prior)	
	Mean Number Present During Year-L _x	Number With Some Dis- ability During Year	Mean Number Present During Year-L _x	Number With Some Dis- ability During Year	Mean Number Present During Year-L _x	Number With Some Dis- ability During Year	Mean Number Present During Year-L _x	Number With Some Dis- ability During Year
ARTHRITIS								
1	27.0	14	44.0	11	60.5	21	110.0	21
2	21.5	4	38.5	6	41.5	3	87.5	10
3	14.5	3	31.0	8	26.5	1	77.0	10
4	7.0	0	16.5	4	12.0	0	52.0	1
5	4.0	0	14.0	1	4.0	0	46.0	6
HEART DISEASE								
1	32.0	31	43.0	13	44.0	26	81.5	40
2	17.5	8	33.5	8	28.0	8	65.5	20
3	6.5	1	23.5	6	14.0	2	48.5	11
4	1.5	1	14.0	6	5.0	0	22.0	6
5	0.0	0	9.6	2	1.0	0	17.0	5
HYPERTENSIVE VASCULAR DISEASE AND ARTERIOSCLEROSIS								
1	17.5	8	22.5	6	43.0	16	48.0	9
2	10.0	1	15.0	3	33.5	6	34.5	4
3	8.5	1	10.0	1	16.5	0	28.0	2
4	2.5	0	4.5	1	6.0	0	15.5	0
5	1.0	0	3.5	0	2.5	1	12.5	1
PSYCHONEUROSIS AND CHRONIC NERVOUSNESS								
1	8.0	5	19.5	4	35.0	21	40.5	8
2	6.5	1	15.5	2	26.5	3	28.5	2
3	2.5	0	12.0	1	16.5	4	19.5	3
4	1.5	0	2.0	0	9.5	1	6.0	0
5	1.0	0	0.5	0	5.0	1	6.0	0

Appendix Table 5-A. Mean number of persons at risk and the number in each year who suffered some disability during that year. Eastern Health District of Baltimore, June, 1938-May, 1943.

YEAR OF OBSER- VATION	MALES				FEMALES			
	New (1st Diagnosis)		Old (Onset Prior)		New (1st Diagnosis)		Old (Onset Prior)	
	Mean Number Present During Year-Lx	Number With Some Dis- ability During Year	Mean Number Present During Year-Lx	Number With Some Dis- ability During Year	Mean Number Present During Year-Lx	Number With Some Dis- ability During Year	Mean Number Present During Year-Lx	Number With Some Dis- ability During Year
RHEUMATIC FEVER								
1	13.5	12	25.0	8	11.0	11	38.5	23
2	8.0	1	19.5	4	7.0	1	31.0	10
3	3.5	0	18.0	3	3.0	2	24.5	4
4	1.0	0	8.0	4	1.0	0	8.0	2
5	1.0	0	6.5	1	0.5	0	6.5	0
VARICOSE VEINS								
1	4.0	4	4.0	0	7.0	4	47.0	9
2	2.0	1	3.5	0	5.5	0	42.0	3
3	0.0	0	3.0	1	3.5	0	34.0	0
4	0.0	0	2.5	1	1.5	0	18.0	1
5	0.0	0	2.0	1	0.0	0	15.5	1
GALL-BLADDER DISEASE								
1	2.0	1	1.5	0	18.5	11	28.5	16
2	2.0	0	1.0	0	11.5	3	21.5	5
3	2.0	0	1.0	0	7.0	1	18.0	5
4	2.0	0	0.0	0	2.0	0	11.9	0
5	1.0	0	0.0	0	0.5	0	9.5	3
DIABETES								
1	4.5	3	23.0	3	5.0	2	7.0	4
2	3.0	1	17.0	1	3.5	0	6.0	0
3	1.0	0	14.0	2	3.0	0	4.5	0
4	0.0	0	10.0	0	1.0	1	2.5	1
5	0.0	0	9.0	0	0.0	0	1.5	0

Appendix Table 5-B. Mean number of persons at risk and the number in each year who suffered some disability during that year. Eastern Health District of Baltimore, June, 1938-May, 1943.

YEAR OF OBSER- VATION	NEW CASES (FIRST DIAGNOSIS DURING OBSERVATION)				OLD CASES (ONSET PRIOR TO OBSERVATION)			
	w _x Number With- drawn Living During Year	d _x Number Dying During Year	r _x Number Becoming Perma- nently Disabled During Year	Recov- ered and Reentered at Risk of Disability	w _x Number With- drawn Living During Year	d _x Number Dying During Year	r _x Number Becoming Perma- nently Disabled During Year	Recov- ered and Reentered at Risk of Disability
ARTHRITIS								
1	4	0	0	0	4	0	0	0
2	4	1	0	11	2	1	0	11
3	3	0	0	3	3	3	1	6
4	2	0	0	2	0	1	0	4
5	2	0	0	0	0	0	0	4
HEART DISEASE								
1	6	8	2	0	5	3	0	0
2	5	4	1	17	1	8	0	8
3	7	0	0	3	2	1	1	3
4	3	0	1	1	4	2	2	3
5	0	0	0	0	1	1	0	2
HYPERTENSIVE VASCULAR DISEASE AND ARTERIOSCLEROSIS								
1	5	0	0	0	8	1	2	0
2	2	0	0	3	2	0	1	2
3	1	0	0	1	3	1	0	3
4	1	0	0	0	0	1	0	0
5	2	0	0	0	1	0	0	0
PSYCHONEUROSIS AND CHRONIC NERVOUSNESS								
1	0	0	0	0	3	0	1	0
2	3	0	0	5	2	1	0	2
3	1	0	0	1	0	0	0	2
4	1	0	0	0	0	0	0	0
5	0	0	0	0	1	0	0	0

Appendix Table 6-A. Number of males withdrawn living, number dying, number who became permanently disabled and the number who reentered, that is, were again at risk of disability in each year. Eastern Health District of Baltimore, June, 1938-May, 1943.

YEAR OF OBSER- VATION	NEW CASES (FIRST DIAGNOSIS DURING OBSERVATION)				OLD CASES (ONSET PRIOR TO OBSERVATION)			
	W _a Number With- drawn Living During Year	d _a Number Dying During Year	r _a Number Becoming Perma- nently Disabled During Year	Recover- ed and Reentered at Risk of Disability	W _a Number With- drawn Living During Year	d _a Number Dying During Year	r _a Number Becoming Perma- nently Disabled During Year	Recover- ed and Reentered at Risk of Disability
RHEUMATIC FEVER								
1	5	0	1	0	3	1	1	0
2	0	0	0	6	1	0	0	4
3	1	0	0	1	1	1	0	3
4	0	0	0	0	0	0	0	1
5	0	0	0	0	1	0	0	3
VARICOSE VEINS								
1	0	0	0	0	0	0	0	0
2	1	1	0	3	1	0	0	0
3	0	0	0	0	0	0	0	0
4	0	0	0	0	0	1	0	1
5	0	0	0	0	0	0	0	0
GALL-BLADDER DISEASE								
1	0	0	0	0	1	0	0	0
2	0	0	0	1	0	0	0	0
3	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0
5	2	0	0	0	0	0	0	0
DIABETES								
1	2	0	1	0	0	0	0	0
2	0	1	0	1	1	1	0	4
3	0	0	0	0	1	0	0	0
4	0	0	0	0	1	0	0	0
5	0	0	0	0	1	0	0	1

Appendix Table 6-B. Number of males withdrawn living, number dying, number who became permanently disabled and the number who reentered, that is, were again at risk of disability in each year. Eastern Health District of Baltimore, June, 1938-May, 1943.

YEAR OF OBSER- VATION	NEW CASES (FIRST DIAGNOSIS DURING OBSERVATION)				OLD CASES (ONSET PRIOR TO OBSERVATION)			
	<i>w_s</i> Number With- drawn Living During Year	<i>d_s</i> Number Dying During Year	<i>r_s</i> Number Becoming Perma- nently Disabled During Year	Recov- ered and Reentered at Risk of Disability	<i>w_s</i> Number With- drawn Living During Year	<i>d_s</i> Number Dying During Year	<i>r_s</i> Number Becoming Perma- nently Disabled During Year	Recov- ered and Reentered at Risk of Disability
ARTHRITIS								
1	7	0	1	0	8	2	1	0
2	15	0	0	14	7	2	1	17
3	7	0	0	3	6	0	0	9
4	4	0	0	0	4	0	0	7
5	4	0	0	0	3	0	0	1
HEART DISEASE								
1	7	3	2	0	3	4	3	0
2	7	1	1	14	11	4	0	32
3	7	1	0	5	4	5	0	14
4	1	1	0	0	1	3	0	3
5	0	0	0	0	4	0	0	3
HYPERTENSIVE VASCULAR DISEASE AND ARTERIOSCLEROSIS								
1	2	2	0	0	8	0	2	0
2	7	0	0	13	4	3	0	7
3	13	0	0	4	2	0	0	3
4	4	0	0	0	1	0	0	1
5	1	0	0	0	0	1	0	0
PSYCHONEUROSIS AND CHRONIC NERVOUSNESS								
1	4	0	0	0	3	0	0	0
2	5	0	0	16	5	0	0	5
3	5	0	0	3	1	0	0	2
4	3	0	0	3	0	0	0	0
5	2	0	0	1	0	0	0	0

Appendix Table 7-A. Number of females withdrawn living, number dying, number who became permanently disabled and the number who reentered, that is, were again at risk of disability in each year. Eastern Health District of Baltimore, June, 1938-May, 1943.

YEAR OF OBSER- VATION	NEW CASES (FIRST DIAGNOSIS DURING OBSERVATION)				OLD CASES (ONSET PRIOR TO OBSERVATION)			
	W _s Number With- drawn Living During Year	d _s Number Dying During Year	F _s Number Becoming Perma- nently Disabled During Year	Recov- ered and Reentered at Risk of Disability	W _s Number With- drawn Living During Year	d _s Number Dying During Year	F _s Number Becoming Perma- nently Disabled During Year	Recov- ered and Reentered at Risk of Disability
RHEUMATIC FEVER								
1	4	0	0	0	4	1	0	0
2	1	1	0	6	0	0	0	16
3	3	1	0	0	4	1	0	10
4	0	0	0	1	0	0	0	1
5	1	0	0	0	1	0	0	1
VARICOSE VEINS								
1	2	0	0	0	0	0	0	0
2	1	0	0	2	1	1	0	6
3	1	0	0	0	5	3	0	4
4	1	0	0	0	3	1	0	0
5	0	0	0	0	1	0	0	1
GALL BLADDER DISEASE								
1	3	2	0	0	1	0	0	0
2	3	0	0	8	5	0	0	12
3	0	0	0	3	2	0	0	4
4	3	0	0	1	0	0	0	3
5	1	0	0	0	1	0	0	0
DIABETES								
1	0	1	0	0	3	1	0	0
2	2	0	0	3	2	0	0	3
3	2	0	0	1	2	0	0	1
4	0	0	0	0	0	0	0	1
5	0	0	0	0	1	1	0	0

Appendix Table 7-B. Number of females withdrawn living, number dying, number who became permanently disabled and the number who reentered, that is, were again at risk of disability in each year. Eastern Health District of Baltimore, June, 1938-May, 1943.

RHEUMATIC FEVER AND STREPTOCOCCAL ILLNESS IN TWO COMMUNITIES IN NEW YORK STATE

JANE E. COULTER¹

MORBIDITY surveys which are conducted by periodic visits to families offer special advantages in the study of incidence and prevalence of nonreportable diseases, such as rheumatic fever and streptococcal illness, in their population. The study of acute respiratory illness that was conducted in two communities, Pleasantville and Mt. Kisco, in Westchester County, New York, from September, 1946 to June, 1949 included records of attacks of tonsillitis and related illness and rheumatic fever as it was reported in those populations. The purpose of this paper is to present data on these illnesses.

DATA AND METHOD OF STUDY

The periodic survey of families for the purpose of collection of illness records was the method employed in this study. All families in which there were one or more children attending grade school or high school in each of the two communities were included. These families were visited every twenty-eight days during the three school years, September to June, 1946-1949. On each visit to the family, inquiry was made about acute respiratory illnesses which had occurred among their members during the past four weeks. Visits were not made during the summer months because it was believed that observation during that period would be incomplete since some children go to summer camps and often the entire family is away from the community for part or all of the summer.

Each family visitor was given a list of the common acute respiratory illnesses in the terminology generally used by the family informant. In this particular analysis, streptococcal illnesses include the following: tonsillitis, septic sore throat,

¹ From the Milbank Memorial Fund. This is the eighth in a series of papers dealing with a study of respiratory illness.

peritonsillitis, otitis media, mastoiditis, and scarlet fever.² Any acute respiratory illness accompanied by signs of cervical adenitis, that is, swollen glands, was also included. Inquiry was made about the presence or absence of each of these illnesses among members of the family.

This study includes records of both histories and active cases of rheumatic fever. A history of rheumatic fever in any member of the household was recorded on the first visit to the family. Any acute attack of rheumatic fever was recorded when first reported and inquired about on each monthly visit to the family.

The sickness record included the nature of the illness as stated by the informant, usually the mother, and the date of onset and duration of the illness. In the study in Pleasantville and Mt. Kisco the diagnoses were not based on laboratory tests for the presence of the infecting organisms.

It is recognized that in a study such as this many diagnoses may lack medical confirmation. Considering all respiratory illness in both communities only 18 per cent had medical attendance. However, approximately 90 per cent of the cases with a diagnosis of tonsillitis or streptococcal sore throat were attended by a physician. In the rheumatic fever families 100 per cent of such illnesses were attended by a physician. Forty-seven per cent of the cases included in the group of streptococcal illness because of swollen glands had a physician's care. The same was true of the rheumatic families. Both communities were similar with respect to the proportions medically attended.

The mean number of families visited during the three school years of the special study was 530 in Pleasantville and 570 in Mt. Kisco. The families in Pleasantville included some 2,100 persons and those in Mt. Kisco 2,400. In each group of families there were about 900 school-age children and 180 to 200 pre-school-age children.

² In the two years studied there was total of only four cases reported as scarlet fever in both communities combined. In New York State scarlet fever is not reported under that terminology. It is reported as "strep. sore throat (including scarlet fever)."

CHARACTERISTICS OF THE TWO COMMUNITIES

In the study of acute respiratory illness, data were obtained from each family which reveal certain social characteristics of the family. These data included: a census of the household, the age, sex, and marital status of the members, the occupation and place of employment of all employed members, and the highest education attained for all members of the household.

A description of the two communities with respect to these characteristics has been presented in previous reports (1,2). The two communities were found to be comparable with respect to loss of families due to moving and refusal to cooperate, age distribution of the family members, age of husbands and wives, and size of family. There were, however, marked differences between the two communities in the educational attainment of the husbands and wives and in the occupation of the head of the household. For example, 40 per cent of the heads of the household in the Pleasantville families had a college education compared with 15 per cent in Mt. Kisco. Fifty-four per cent of the household heads in Pleasantville were in the professional or managerial class compared with 36 per cent in Mt. Kisco. None of these differences between the communities is believed to affect the data presented in this paper.

INCIDENCE OF TONSILLITIS AND RELATED ILLNESS

In both Pleasantville and Mt. Kisco, tonsillitis and related illnesses accounted for 7 per cent of the total acute respiratory illness, 5 per cent tonsillitis and 2 per cent other illness, reported during the last two years of the study, September to June, 1947-1949.³ The incidence of these illnesses is shown in Table 1 for persons of all ages in each community for the two study years. The population is composed of the persons counted in each year that they were observed. The incidence varied from 78.3 to 100.1 per 1,000 in Pleasantville and from 85.4 to 99.5 per 1,000 in Mt. Kisco.

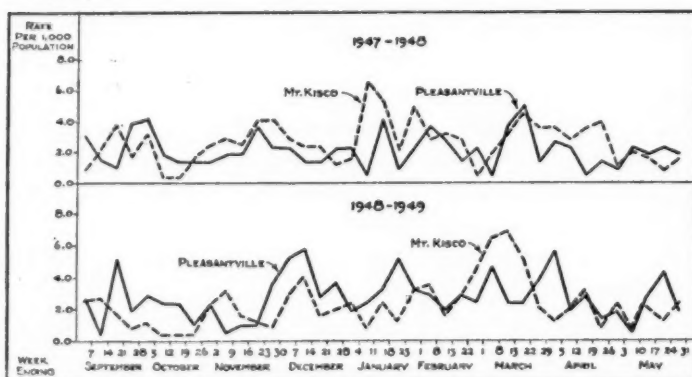
³ A question concerning the presence or absence of swollen cervical glands was added to the illness schedules in September, 1947. Therefore, this analysis includes the illness experience of the 1947-1948 and 1948-1949 study years only.

SCHOOL YEAR AND COMMUNITY	RATE PER 1,000 POPULATION	CASES OF STREPTOCOCCAL ILLNESS	POPULATION OBSERVED
<i>September, 1947—June, 1948</i>			
Pleasantville	78.3	181	2,312
Mt. Kisco	99.5	254	2,554
<i>September, 1948—June, 1949</i>			
Pleasantville	100.1	227	2,268
Mt. Kisco	85.4	223	2,612

Table 1. Incidence of streptococcal illness in Pleasantville and Mt. Kisco for the nine-month period in each of two study years, September to June, 1947-1949.

Figure 1 shows the weekly incidence of tonsillitis and related illness (Appendix Tables 1 and 2). The heavy line indicates the rates for Pleasantville and the broken line those for Mt. Kisco. From these data there appear to have been in each school year four periods of relatively high incidence of tonsillitis and related illness. One period was in September, the second in November, the third in January, and the fourth in March and the early part of April. These are the periods when all types of respiratory illnesses are most frequent. The weekly incidence in each of the two communities was fairly similar in each study year.

Fig. 1. Weekly incidence of streptococcal illness in Pleasantville and Mt. Kisco for the nine-month period in each of two study years, September, 1947 to June, 1949.



These rates are based upon the observation of about 2,100 to 2,400 persons in each week in each community.

In brief summary, tonsillitis and related illnesses accounted for 7 per cent of the total acute respiratory illness reported in the two communities in 1947-1948 and 1948-1949. The incidence of these illnesses was similar in the two communities in each of the two school years.¹

RHEUMATIC FEVER

Rheumatic fever is a disease believed to be closely related to streptococcal infections. The prevention of acute rheumatic fever by the prompt treatment of streptococcal infections with penicillin emphasizes the close relationship between streptococcal disease and rheumatic fever (3,4,5).

In Pleasantville there were forty-three persons who had a history of having had active rheumatic fever prior to the study. In addition there were two persons whose disease was considered as active during observation. No newly diagnosed cases were reported in this community during the three years, September, 1946 to June, 1949.

In Mt. Kisco there were thirty-one persons who had a history of having had active rheumatic fever prior to the study. There were also nine persons whose disease was considered active during observation. In addition, seven newly diagnosed cases were reported during the three years. Two of these cases were preceded by scarlet fever and one by an attack of tonsillitis.

Incidence. A study carried on by the United States Public Health Service and the Milbank Memorial Fund among a representative sample of white families in the Eastern Health District of Baltimore between June, 1938 and May, 1943 reported an annual incidence of rheumatic fever for both sexes of 1.20 per 1,000 population (6). In Mt. Kisco the annual incidence of rheumatic fever was 0.94 per 1,000 population. This rate is fairly similar to the rate reported in the Eastern Health District Study.

Prevalence. The study in the Eastern Health District of

OCCUPATIONAL CLASS	PLEASANTVILLE	Mt. KISCO
	Rate Per 1,000	
ALL AGES—TOTAL	14.8	14.1
Professional and Managerial	14.9	14.8
Clerical and Skilled	14.6	14.0
Semi-Skilled and Unskilled	14.8	13.5

Table 2. Prevalence of rheumatic fever among persons in Pleasantville and Mt. Kisco, September to June, 1946-1949.

Baltimore reported a prevalence of persons having rheumatic fever during an average twelve-month period of 13.5 per 1,000 population (7). The prevalence of persons who had had rheumatic fever in Pleasantville was 14.8 per 1,000 population and in Mt. Kisco 14.1 per 1,000 population (Table 2 and Appendix Table 3). In expressing the prevalence for Pleasantville and Mt. Kisco, all persons who had a history or who had active rheumatic fever during the period of observation have been included. The population is composed of the persons counted only once during the three years of the study (Appendix Table 4). The prevalence of persons with a case of rheumatic fever in Pleasantville and Mt. Kisco is similar to the prevalence of persons reported in the study by the United States Public Health Service and the Milbank Memorial Fund in the Eastern Health District of Baltimore. The prevalence in the two communities also is strikingly similar.

Table 2 also shows for both communities the prevalence of persons who had rheumatic fever. The data are arrayed by the occupational class of the head of the household.⁴ The prevalence of persons in the three occupational classes was similar. Rheumatic fever did not appear to have been selective of persons in any particular occupational class.

Age at First Diagnosis. Swift states that rheumatic fever is rarely seen in infants and begins to appear in children about 5 years of age. The disease increases in the frequency of occur-

⁴ Coding of occupational class was based upon the Alphabetical Index of Occupations and Industries. United States Department of Commerce, Bureau of the Census, Sixteenth Census of the United States, 1940.

COMMUNITY	MALE	FEMALE	RATIO OF FEMALES TO MALES
	Rate Per 1,000		
Pleasantville	10.7	18.7	1.75
Mt. Kisco	12.2	15.9	1.30

Table 3. Prevalence of persons having rheumatic fever by sex in Pleasantville and Mt. Kisco, September, 1946 to June, 1949.

rence until the ages of 9 to 11 years. After puberty there is a marked decline in incidence as age increases (8). In his monograph on rheumatic fever, Paul discussed some of the difficulties in determining the age at onset of rheumatic fever. He concluded that "Epidemiologically . . . it is reasonable to regard rheumatic fever as a disease of childhood or school age, because from the age distribution of first attacks the period of mid-childhood is the period of greatest vulnerability." (9).

The mean age at first diagnosis of rheumatic fever for the age group 0-19 was 6.4 in Pleasantville and 8.5 in Mt. Kisco.⁵ Hedley analyzed the records of 2,539 patients with rheumatic fever admitted to Philadelphia hospitals between January 1, 1930 and December 31, 1934. From his data the mean age at the first reported attack for the 1939 cases in the 0-19 year age group was 10.3 years (10). This mean age is higher but not significantly so than the mean ages in Pleasantville and Mt. Kisco for the same age group.

Adults with a history of rheumatic fever have been excluded from this tabulation of age at first diagnosis because it was be-

	Mean Age at Onset of Rheumatic Fever (Age Group 0-19)	Standard Error of the Mean	Standard Deviation
Pleasantville	6.4	±0.91	3.03
Mt. Kisco	8.5	±0.99	4.18

The difference between the mean ages is not statistically significant. The standard error of the difference between means was the test used and the value for "t" was obtained by computing the ratio of the difference between means to the standard error of the difference between the means.

$$\sigma_d = \sqrt{\frac{S_1 + S_2}{N_1 + N_2 - 2} + \frac{S_1 + S_2}{N_1 + N_2 - 2}}$$

lieved that information concerning age at first diagnosis would not be entirely reliable due to the factor of memory.

Sex. The prevalence of persons of all ages who had rheumatic fever is shown by sex in Table 3 for Pleasantville and Mt. Kisco. In Pleasantville the prevalence of rheumatic fever among females was 75 per cent higher than the prevalence among males. In Mt. Kisco the prevalence among females was 30 per cent higher than the prevalence among males.

RHEUMATIC FAMILIES

Over a period of years observers have noticed that rheumatic fever is more prevalent under certain conditions associated with poverty, such as crowding, dampness, and unhygienic environment (8,9,11,12). The environmental conditions under which the family lived were considered one of the predisposing factors in the production of rheumatic fever. Certain small areas such as a section of a city were thought to be the harborers of the disease.

Rheumatic families in this analysis were selected on the basis of the presence in the family of a person or persons who had or had had rheumatic fever. There were forty-two such families in Pleasantville with forty-three persons who had or had had rheumatic fever and forty-four families in Mt. Kisco with forty-

Table 4. Distribution of heads of the households by occupational class, Pleasantville and Mt. Kisco combined.¹

OCCUPATIONAL CLASS	PER CENT		NUMBER	
	Rheumatic Families	All Families 1947-1948	Rheumatic Families	All Families 1947-1948
TOTAL	100.0	100.0	86	934 ²
Professional and Managerial	41.9	44.6	36	417
Clerical and Skilled	31.4	30.4	27	284
Semi-Skilled and Unskilled	26.7	25.0	23	233

¹The data for all families are based on the middle study year 1947-1948.

²Excludes sixty-one families in which the head of the household is not employed and one family in which the employment is unknown.

TYPE OF FAMILY	FIRST QUARTILE	MEDIAN	THIRD QUARTILE	NUMBER OF FAMILIES
Rheumatic Families	4.0	4.9	6.4	86
All Families (1947-1948)	4.2	4.9	5.9	995

Table 5. Median number of persons per family in rheumatic families and in all families, Pleasantville and Mt. Kisco combined.

six such persons.⁶ Because of the small number of rheumatic families in each community the data from the two communities have been combined for the family analysis.

Economic Status. The occupational class of the head of the household is generally indicative of the economic situation of the family. Table 4 shows a comparison of the distribution of the rheumatic households by the occupational class of the head of the household compared with the distribution of all households. The rheumatic families were distributed throughout the occupational classes in proportions similar to the total families.

Size of Family. The median number of persons per family in the rheumatic families and in the total families in both communities is shown in Table 5.⁷ The median values are exactly the same, 4.9 for the rheumatic families and 4.9 for the total families.

Crowding. Crowding in households has been suggested as a contributing factor to the development of rheumatic fever (8,9,11,12). The crowding ratings of the rheumatic families and of the total families observed in the two communities in 1947-1948 are shown in Table 6. The term "crowding rating" as used in this study takes into consideration the age and sex of the total persons in the household in relation to the total rooms necessary for a minimum amount of privacy and comfort. A complete description of the crowding rating is given in Appendix 5. Only those rheumatic families in which the child

⁶ Since the family study includes a study of illness in the observed population, three persons with histories of rheumatic fever have been excluded because they were observed for illness for only a short period of time.

⁷ The data for the total families are based on the 1947-1948 study year.

was the person who had had rheumatic fever were considered in Table 6. Adults with histories of rheumatic fever may have been living under entirely different crowding conditions at the onset of their illness. Column 3 of Table 6 gives the per cent that the rheumatic families were of the total families in the two groups, those rated as adequate and those rated as unsatisfactory with respect to crowding. The difference between the per cents was not statistically significant.⁸ In this study it does not appear that the rheumatic families in which the child was the person who had had rheumatic fever were any more crowded than was true of the total families studied.

Multiple Cases in a Family. In Pleasantville there were forty-three persons who had had rheumatic fever in forty-two families. The two persons in one family were a wife aged 37 and her mother aged 72. In Mt. Kisco there were forty-six persons who had had rheumatic fever in forty-four families. One family had two persons with histories of rheumatic fever, a mother aged 37 and her daughter aged 13. The other family had two persons with rheumatic histories, a mother aged 48 and her daughter aged 16. In both communities the multiple cases were histories, i.e., the attacks of rheumatic fever occurred prior to the study.

Table 6. Distribution of the rheumatic families and the total families by crowding ratings in Pleasantville and Mt. Kisco.

CROWDING RATING	FAMILIES WITH A CASE OR CASES OF RHEUMATIC FEVER ¹	ALL FAMILIES IN BOTH COMMUNITIES 1947-1948	PER CENT RHEUMATIC FAMILIES WERE OF TOTAL FAMILIES BY SPECIFIC CROWDING RATINGS
Adequate	28	739	3.8
Unsatisfactory	12	243	4.9

¹Includes only those families in which the child was the person with the case or history of rheumatic fever.

⁸The standard error of the difference between per cents was the test used and the value for "z" was obtained by computing the ratio of the difference between per cents to the standard error of the difference between the per cents. The formula is

$$\sigma_d = \sqrt{\frac{P_1 Q_1}{N_1} + \frac{P_2 Q_2}{N_2}}$$

Streptococcal Illness in Rheumatic Families. The simple family was the type of family unit selected for the study of familial susceptibility to tonsillitis and related illness because of the close relationship of the family members. The simple family unit was defined as the spouse or spouses and their children. All other relatives and all unrelated persons in the households have been excluded.

The hypothesis that rheumatic persons and their immediate families were especially susceptible to tonsillitis and related illnesses was tested by chi square. In Pleasantville a greater

Table 7. Observed and expected number of persons with streptococcal illness in Pleasantville and Mt. Kisco, September, 1947-May, 1949.

ALL AGES	OBSERVED NUMBER	EXPECTED NUMBER	CHI SQUARE	P
<i>Pleasantville</i>				
All Persons Having:				
Streptococcal Illness	495	501.24	11.44	< .001
No Streptococcal Illness	3,703	3,696.76		
Rheumatic Persons Having: ¹				
Streptococcal Illness	10	3.82	28.18	< .01
No Streptococcal Illness	22	28.18		
All Persons Having:				
Streptococcal Illness	495	503.76	6.84	< .01
No Streptococcal Illness	3,703	3,694.24		
Related Persons in Rheumatic ¹				
Families Having:				
Streptococcal Illness	22	13.20	96.80	< .001
No Streptococcal Illness	88	96.80		
<i>Mt. Kisco</i>				
All Persons Having:				
Streptococcal Illness	541	547.97	11.94	< .001
No Streptococcal Illness	4,191	4,184.03		
Rheumatic Persons Having: ¹				
Streptococcal Illness	12	4.86	37.14	< .001
No Streptococcal Illness	30	37.14		
All Persons Having:				
Streptococcal Illness	541	560.74	26.23	< .001
No Streptococcal Illness	4,191	4,171.26		
Related Persons in Rheumatic ¹				
Families Having:				
Streptococcal Illness	37	17.30	128.70	< .001
No Streptococcal Illness	109	128.70		

¹Rheumatic cases and related persons counted once for the two-year experience

proportion of rheumatic persons had tonsillitis and related illness than did the total population included in the study (Table 7). Also, a greater proportion of their closely related family members had these illnesses than was true of the total population. In each instance the observed number of rheumatic persons and their closely related family members who had tonsillitis and related illnesses exceeded the expected number of such persons. These differences between the observed and expected number of persons were statistically significant and differences such as these would occur in less than 1 in 1,000 chances among rheumatic cases and in less than 1 in 100 chances among their related family members.

The lower section of Table 7 shows the same data for Mt. Kisco. In that community also a greater proportion of both rheumatic persons and their immediate family members had tonsillitis and related illnesses than did the total population studied. Again, the differences between the observed and expected number of persons were statistically significant and such differences would occur in less than 1 in 1,000 chances. These data indicate that a familial susceptibility to tonsillitis and related illness did exist in the rheumatic families in the two communities studied.

SUMMARY

This paper presents data on tonsillitis and related illness and rheumatic fever that were reported in the study of respiratory illness in two communities, Pleasantville and Mt. Kisco in Westchester County, New York, from September, 1946 to June, 1949.

Tonsillitis and related illness accounted for 7 per cent of the total acute respiratory illness during the second and third years of the study, September, 1947 to June, 1949. The total incidence and the seasonal incidence of these illnesses was similar in the two communities in the last two study years.

The annual incidence of rheumatic fever in Pleasantville was 0 during the three years of observation and in Mt. Kisco the

rate was 0.94 per 1,000 population. The prevalence of persons having active and non-active rheumatic fever was 14.8 in Pleasantville and 14.1 in Mt. Kisco during the three years of the study. The mean age at first diagnosis of rheumatic fever in the 0-19 year age group was 6.4 in Pleasantville and 8.5 in Mt. Kisco. A higher prevalence of persons having rheumatic fever was noted among females than among males.

Environmental conditions seemed to exert little influence on the prevalence of rheumatic fever in this study. Occupational class was used as a measure of economic status. No difference in the prevalence of persons having rheumatic fever was observed among the three occupational classes. Rheumatic families were similar to the total families with respect to crowding in the households.

The hypothesis that rheumatic persons and their immediate family members were especially susceptible to streptococcal illnesses was tested by a comparison of their experience with respect to such illness during observation with that of the total universe from which they were drawn. In both Pleasantville and Mt. Kisco a significantly higher proportion of persons in the rheumatic families had one or more attacks of streptococcal illness than would have been expected from the experience of the total families. These data do indicate that a familial susceptibility to streptococcal illness may exist in rheumatic families.

Acknowledgments are made to Dr. Mildred W. Wells and to the Westchester County Department of Health for generous assistance and cooperation which greatly facilitated the study of acute respiratory illness.

An especial acknowledgment is made to the families in Pleasantville and Mt. Kisco who participated in the study.

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Appendix Table 1. Weekly incidence of streptococcal illness in *Pleasantville* for the nine-month period in each of two study years, September to June, 1947-1949.

DATE	RATE PER 1,000 POPULATION		CASES OF STREPTOCOCCAL ILLNESS		POPULATION OBSERVED	
	1947-1948	1948-1949	1947-1948	1948-1949	1947-1948	1948-1949
<i>September</i>						
1-7	3.1	2.7	6	5	1,949	1,824
8-14	1.5	0.5	3	1	2,011	1,924
15-21	1.0	5.2	2	10	2,034	1,933
22-28	3.9	2.0	8	4	2,066	2,020
29-Oct. 5	4.2	2.9	9	6	2,124	2,067
<i>October</i>						
6-12	1.9	2.4	4	5	2,135	2,073
13-19	1.4	2.4	3	5	2,160	2,082
20-26	1.4	1.0	3	2	2,143	2,101
27-Nov. 2	1.4	2.4	3	5	2,143	2,101
<i>November</i>						
3-9	1.9	0.5	4	1	2,142	2,103
10-16	1.9	1.0	4	2	2,152	2,105
17-23	3.7	1.0	8	2	2,163	2,103
24-30	2.3	3.8	5	8	2,165	2,128
<i>December</i>						
1-7	2.3	5.3	5	11	2,159	2,092
8-14	1.4	5.8	3	12	2,162	2,085
15-21	1.4	2.8	3	6	2,167	2,125
22-28	2.3	3.7	5	8	2,174	2,155
29-Jan. 4	2.3	1.9	5	4	2,197	2,114
<i>January</i>						
5-11	0.5	2.4	1	5	2,185	2,102
12-18	4.2	3.3	9	7	2,160	2,110
19-25	0.9	5.2	2	11	2,140	2,100
26-Feb. 1	2.3	3.3	5	7	2,140	2,100
<i>February</i>						
2-8	3.7	2.9	8	6	2,152	2,081
9-15	2.8	1.9	6	4	2,174	2,076
16-22	1.4	2.9	3	6	2,176	2,073
23-Mar. 1	2.3	2.4	5	5	2,173	2,081
<i>March</i>						
2-8	0.5	4.7	1	10	2,171	2,115
9-15	3.7	2.4	8	5	2,183	2,104
16-22	5.0	2.4	11	5	2,190	2,101
23-29	1.4	3.8	3	8	2,192	2,102
30-Apr. 5	2.7	5.7	6	12	2,183	2,100
<i>April</i>						
6-12	2.3	1.9	5	4	2,190	2,096
13-19	0.5	2.9	1	6	2,156	2,085
20-26	1.4	1.4	3	3	2,140	2,109
27-May 3	0.9	1.9	2	4	2,140	2,109
<i>May</i>						
4-10	2.3	0.5	5	1	2,137	2,084
11-17	1.9	2.9	4	6	2,142	2,091
18-24	2.3	4.3	5	9	2,150	2,104
25-31	1.9	1.9	4	4	2,137	2,100

Appendix Table 2. Weekly incidence of streptococcal illness in *Mt. Kisco* for the nine-month period in each of two study years, September to June, 1947-1948.

DATE	RATE PER 1,000 POPULATION		CASES OF STREPTOCOCCAL ILLNESS		POPULATION OBSERVED	
	1947-1948	1948-1949	1947-1948	1948-1949	1947-1948	1948-1949
<i>September</i>						
1-7	0.9	2.6	2	6	2,172	2,295
8-14	2.2	2.7	5	6	2,260	2,243
15-21	3.8	1.7	9	4	2,346	2,334
22-28	1.7	0.8	4	2	2,394	2,399
29-Oct. 5	3.3	1.2	8	3	2,417	2,480
<i>October</i>						
6-12	0.4	0.4	1	1	2,414	2,493
13-19	0.4	0.4	1	1	2,415	2,496
20-26	1.7	0.4	4	1	2,409	2,490
27-Nov. 2	2.5	2.4	6	6	2,409	2,490
<i>November</i>						
3-9	2.9	3.2	7	8	2,408	2,469
10-16	2.5	1.6	6	4	2,413	2,453
17-23	4.1	1.2	10	3	2,424	2,450
24-30	4.1	0.8	10	2	2,424	2,473
<i>December</i>						
1-7	2.9	2.9	7	7	2,428	2,454
8-14	2.4	4.1	6	10	2,450	2,456
15-21	2.4	1.6	6	4	2,463	2,492
22-28	1.2	2.0	3	5	2,441	2,501
29-Jan. 4	1.6	2.4	4	6	2,463	2,476
<i>January</i>						
5-11	6.5	0.8	16	2	2,457	2,462
12-18	5.3	2.4	13	6	2,447	2,461
19-25	2.0	1.2	5	3	2,460	2,458
26-Feb. 1	4.9	3.3	12	8	2,460	2,458
<i>February</i>						
2-8	2.8	3.6	7	9	2,475	2,471
9-15	3.2	1.6	8	4	2,470	2,461
16-22	2.8	2.9	7	7	2,462	2,446
23-Mar. 1	0.4	4.5	1	11	2,462	2,447
<i>March</i>						
2-8	2.0	6.5	5	16	2,457	2,447
9-15	3.2	6.9	8	17	2,463	2,464
16-22	4.5	5.2	11	13	2,468	2,480
23-29	3.6	2.0	9	5	2,472	2,493
30-Apr. 5	3.6	1.2	9	3	2,491	2,502
<i>April</i>						
6-12	2.8	2.0	7	5	2,499	2,487
13-19	3.6	3.2	9	8	2,498	2,474
20-26	4.0	0.8	10	2	2,501	2,465
27-May 3	1.2	2.4	3	6	2,501	2,465
<i>May</i>						
4-10	2.0	0.8	5	2	2,491	2,466
11-17	1.6	2.9	4	7	2,497	2,452
18-24	0.8	1.2	2	3	2,499	2,458
25-31	1.6	2.4	4	6	2,495	2,461

AGE GROUP AND OCCUPATIONAL CLASS	PLEASANTVILLE			Mt. Kisco		
	Both Sexes	Male	Female	Both Sexes	Male	Female
ALL AGES—TOTAL ¹	45	16	29	47	20	27
Professional-Manual	23	6	17	17	7	10
Clerical-Skilled	13	6	7	15	6	9
Semiskilled-Unskilled	9	4	5	15	7	8
Age 0-18—Total	12	7	5	16	5	11
Professional-Manual	6	3	3	7	1	6
Clerical-Skilled	3	1	2	3	2	1
Semiskilled-Unskilled	3	3	0	6	2	4
Age 19+—Total	33	9	24	31	15	16
Professional-Manual	17	3	14	10	6	4
Clerical-Skilled	10	5	5	12	4	8
Semiskilled-Unskilled	6	1	5	9	5	4

Appendix Table 3. Number of acute cases and histories of rheumatic fever classified by the age and sex of the rheumatic person and the occupational class of the head of the household. Pleasantville and Mt. Kisco, September, 1946 to June, 1949.

Appendix Table 4. Population¹ by age, sex, and occupational class of the household in Pleasantville and Mt. Kisco, September, 1946 to June, 1949.

AGE GROUP AND OCCUPATIONAL CLASS	PLEASANTVILLE			Mt. Kisco		
	Both Sexes	Male	Female	Both Sexes	Male	Female
ALL AGES—TOTAL	3,040	1,491	1,549	3,334	1,641	1,693
Professional-Manual	1,539	747	792	1,152	547	605
Clerical-Skilled	893	442	451	1,070	527	543
Semiskilled-Unskilled	608	302	306	1,112	567	545
Age 0-18—Total	1,348	672	676	1,538	752	786
Professional-Manual	697	345	352	553	247	306
Clerical-Skilled	381	195	186	494	245	249
Semiskilled-Unskilled	270	132	138	491	260	231
Age 19+—Total	1,692	819	873	1,796	889	907
Professional-Manual	842	402	440	599	300	299
Clerical-Skilled	512	247	265	576	282	294
Semiskilled-Unskilled	338	170	168	621	307	314

¹Each person has been counted only once for the three-year period.

APPENDIX 5.

Instructions (crowding rating) given for determining suitable age and sex for sharing a sleeping room were as follows:

1. *Sex*: One sleeping room for two persons of opposite sex is considered suitable if the two persons are married or if both are under 6 years of age.

2. *Age*: a. A separate sleeping room is to be allowed for infants under 2 years of age, except where there is more than one infant under 2.

b. Two persons under 20 years of age who are of the same sex may share the same sleeping room if there is less than 6 years difference in their ages.

c. Two adults who are 20 years of age or older and of the same sex may share the same sleeping room if there is less than 15 years difference in their ages.

d. An adult who is 20 to 25 years of age may share a room with a younger person of the same sex if there is less than 6 years difference in their ages.

3. *Lodgers*: A separate room is to be allowed for each lodger of different sex, unless a married couple. Related lodgers will be treated in the same way as family members, except that no allowance will be made for a separate living room and kitchen for lodgers.

Crowding Ratings

1. *More Than Adequate*: More than one room for sleeping per person or per married couple plus two additional rooms (for living room and kitchen).

2. *Adequate*: One room for sleeping per person or for each two persons of suitable age and sex plus two additional rooms (for living room and kitchen).

3. *Unsatisfactory*: One room for sleeping for each two persons of suitable age and sex plus one additional room for kitchen. (Total rooms so few in relation to total persons that the living room was used as a sleeping room or more than two persons per sleeping room or persons of unsuitable age and/or sex occupying the same room.)

4. *Very Unsatisfactory*: Less than one room for sleeping for each two persons of suitable age and sex plus additional room for kitchen. (Total rooms so few in relation to total persons that living room and kitchen used as sleeping rooms or more than two persons per sleeping room or persons of unsuitable age and/or sex occupying the same room).

INSTITUTIONAL FACTORS IN SINHALESE FERTILITY*

BRYCE RYAN

THE problem of the functional consistency between high fertility, sex and marriage mores, and social and economic values is a crucial issue in modern Asia. In Ceylon one decade has witnessed a phenomenal decline in death rates but no significant change in birth rates. Although it is possible that fertility is declining, the rate of natural increase is now close to 3 per cent per annum. Even if urban fertility is changing, a matter undemonstrated, it cannot be inferred that Ceylon will follow the western pattern of persistent diffusion of the small family system. Ceylon is overwhelmingly a rural country, and the hiatus between city and village is much greater than in most Western nations. It is unrealistic to expect the rapid diffusion of new values and new techniques from an urban population which itself is probably largely unresponsive to them.¹ A revolutionary development is even less likely to appear spontaneously in the country-side. If fertility is to be reduced materially it must be done through conscious programs of technical education. The fundamental issue is not educational but rather the social engineering problems of integrating a program

* Indebtedness should be expressed to Dr. C. Chandra Sekar who stimulated a number of the questions used in this study, and to Misses Blossom Jayatunge and Malinee Mendis and Messrs. D. C. R. Wickremesinghe and L. D. Jayasena for their field assistance. Mr. Murray Straus, conducting related inquiries, has given freely his data and advice. The inquiry represents one phase of research aided by the Division of Medicine and Public Health of the Rockefeller Foundation in cooperation with the Dept. of Sociology, University of Ceylon. General observations on the Sinhalese are based on three and a half years of personal study of social organization in Ceylon, particularly in four sample Sinhalese villages representing each major region, and studies of the Colombo labor force. For background see the writer's "Socio-Cultural Regions of Ceylon," *Rural Sociology*, March 1950, "The Ceylonese Village and the New Value System," *ibid.* March 1952, and, in collaboration with Sylvia Fernando, "The Female Factory Worker in Colombo," *International Labour Review* Nov.-Dec. 1951. Additional data upon marriage mores will be found in the writer's *CASTE IN THE NEW ASIA—THE SINHALESE SYSTEM*, Rutgers University Press, (in press).

¹ My colleague Mr. Murray Straus has found that University of Ceylon entrants come from families averaging 5.8 children ever born. These homes are generally urbanized and upper class. Since the entrant's average age is 20, it may be inferred the many of these families are completed.

of birth limitation with a society now tied to large family values. This paper is intended to provide a contextual background for the study of institutional elements relevant to fertility and its control. A discussion of certain aspects of the Sinhalese marriage system is followed by more detailed observations on sex and fertility attitudes and mores in one peasant village. It should be understood that the precision and reliability of observations vary indirectly with the strength of tabus. Sex is an improper topic in Ceylon, and as an area of action it is fraught with repressions and tabus. Rather than being a prognosis for family planning, here is one faltering step toward understanding the institutional and psychological milieu within which the problems of fertility must be met.

THE MARRIAGE PATTERN

Controlled fertility is typically associated with the individualistic and romantic marital companionate. No similar social climate exists in Ceylon, nor is it likely soon to exist. If the small-family pattern is introduced, it must be superimposed upon a familial-kinship structure to which marital unions are subordinated and within which the conjugal family develops. Marriage is a calculated and rational extension of kinship; as a relationship between two persons dominated by thoughts of each other it is immoral and atypical. Evidence of social change may be found in the frequency of romantic suicides, but this also shows the continuous power of community and kin. As society is organized the individual has a life-long dependence upon kin. Even among urban sophisticates who would challenge the propriety of marriage by arrangement, few are so hardy as to make the concomitant challenge to kinship authority.

Personal preferences in marriage are not valued highly by village folk. Not only is the old system sacred, the accepted scope of individualism simply does not encompass the issue of mating. Previous acquaintance is usually a matter of unconcern to all parties involved. Although youth will obligingly

speak of romance in longing terms, there is virtually no comprehension of the concept and seldom even a hint of rebellion. There is no behavior system in their experience world which they can identify as romantic courtship.² Public social contact between adolescents is tabu, and husband and wife would no more engage in open endearments than in public sexual intercourse. No doubt with long exposure to even unintelligible Hollywood productions and vernacular romantic novels, a new pattern might be established. Such audiences are few, however, and almost exclusively male. It might be noted that in sophisticated circles, the romantic complex has frequently been directed toward mistresses rather than toward wives. There is a potent and intricate inter-dependency between individual and kin, within which the arranged match is crucial and romantic marriage abhorrent and socially disorganizing. The demonstration of this lies in the detailed view of criteria in spouse selection, and the mating process.

Criteria of spouse selection may be dichotomized into those which are fixed and universal and those which are variable and subject to compromise or balancing. The rigid requirements are: (1) membership in the same ethnic community, i.e. Sinhalese; (2) identity of caste; (3) bride younger than groom; (4) bride a virgin³; (5) horoscopes of each closely matched. The honor of the family blood must be defended against the impurity of another caste and secondarily from the degradation of a union with a less distinguished family line. The precept

² The curious conceptions of romance current among the "emancipated" are illustrated by the lovelorn columns in the daily papers. Frequently heart-rending stories of love unrequited appear—the other party usually being unaware of the suitor's existence. (One lad "threw an inkwell at her" and still she did not respond.) The love letter is known among village youth but is certain to be a reason for punishment if found. These manifestations of "romance" are probably due more to general repressions than to positive courtship intent, or, it may be hazarded, *personalized sex interest*.

³ There is no tabu against widow remarriage in the same sense as among Hindus. It is, however, ill thought of and rare. Regarding virginity, the village proverb asserts that "a broken box is not welcome for a lakh," i.e. 100,000 Rupees. The extent of premarital chastity probably varies widely between villages and in some localities is complicated by a loose definition of marriage. It is customary in many localities for an examination to be made of the cloth on which the newlyweds sleep the first night of marriage. The absence of stain may become a matter of village gossip and enmity between the in-laws.

of virginity is partly supported by the fear that a man of lower caste may have had access to the bride. The pressure toward early marriage for daughters is supported by the probability of increasingly greater dowry or increasingly undesirable applicants for an aging maid, who, in any case must be her husband's junior. With satisfactory evidence on fundamentals, the business of arranging a match can go forward. Agreement rests ultimately in the balancing of various assets and liabilities: dowry power of the girl's people, security and occupational prestige of the boy, and the status of family lines. A boy's personal prestige is often of greater significance than his economic worth and is closely associated with traditional and colonially evolved ratings of vocations.⁴ (Occupational prestige is more closely correlated with dowry than with salary.) In the normal course of village life personal prestige among cultivators is probably determined more by the sobriety and security of the boy's family, while cooking ability might counter-balance a low dowry in a girl. Poor village fathers may dream of acquiring a government peon (flunky, messenger, janitor) for their girl, and the more prosperous, a government clerk or school teacher. Few attain such heights. In the cities the highest personal prestige, and hence dowry, is accorded the civil service elite and the government doctors. The dowry is in a sense an independent variable. The girl's family knows what it can raise and attempts to acquire the highest status husband available. Cross-cousin preference is common but frequently foregone for dowry or other reasons. It is preserved partly because of its inherent evidence of equal lineage status. Although personal attributes such as proved cooking ability, superior education, or even an unusually light complexion, are not overlooked, they are overshadowed by dowry and status.

Both rigid and variable factors operate in a self-consistent

⁴ Occupational prestige ratings were made by village and by urban high school students in a special inquiry conducted in 1951. Results were similar to those found in American studies except that in every instance of an occupation associated with government, the rating was excessively high. Thus a government clerk approaches the position of a lawyer. This tendency to up-grade the government employee was more pronounced among village youth than among the urban.

pattern in support of the familial concept and are directed toward ends inconsistent with the romantic complex. The greatest moral duty of a father is a "good" marriage for his daughter, and this duty falls on a son at the father's death. These are responsibilities to blood kin, fully as much as to the child. Desire for family prestige may press the father or brother toward almost impossible sacrifices.

We have emphasized here the subservient role of the individual to the family; the father in fulfillment of moral obligation, the son as a source of capital in the form of dowry, the daughter as a means of status acquisition. In marriage the individual is both caught and sheltered within his kinship group. The son helps with his sister's dowry and in so doing protects his own status which in turn is rewarded in dowry. Challenge to the arranged match as such is a challenge to the prerogatives of kin. The lineal family as a status bearing entity in the community has its most critical times in the period of approaching marriage. Every kin connection has his own personal position at stake status-wise, economically, or both. Parents know full well that romantic marriage cannot conform to the rigid dictates of caste, prestige, and house honor. It holds a challenge not merely to the father's rightful authority but to the honor of the generations, past and future, of which the father is the legitimate guardian. Marriage by choice has no claim upon kin for dowry, no claim for help in harvest and no claim for cooperation in marrying some ultimate daughter of the union. Although the infrequent romantic marriages in villages do not necessarily meet with ostracism if caste propriety and other rigid matters have been observed, there is partial or complete estrangement from kinfolk, temporarily serious and often with some persisting coolness. In the closely knit affairs of the village, life for such a couple may not be pleasant.

The requirement of astrological suitability deserves special mention. Almost universally the Ceylonese believe in the validity of astrology. Assortative mating in terms of personality and physique is practiced on the assumption that such

matters are perfectly reflected in the horoscopes. One significant feature of the readings is that indicating sexual compatibility. Men and women fall into one of the various classes such as "rat fit," "cat fit" and "cattle fit." It is not possible technically for a woman of "cow fit" to satisfy a man of say "rat fit."⁵ Parents eager to make a match may sometimes call for a second reading of the horoscopes, but if the pair is not fairly closely "mated," the matter is dropped. Needless to say a firm belief in the absolute validity of this system, by young and old, educated and uneducated, retards the use of the Westerner's inexact empirical method of courtship. The romantic urge can easily lead to a union marked for disaster and youth feels it an unnecessary risk. If one does not subscribe to the premises of the system, considerable mismating *in the Western sense* may occur. However, so long as husband-wife relations are construed in non-romantic, non-egalitarian and non-partnership terms, the issue is probably irrelevant.

DOMINANCE OF THE MALE

The Sinhalese family is usually patrilineal, and also patrilocal in the sense that the newly married couple usually settles in the husband's village. The joint family, however, is uncommon. The new marital unit is thus dominated by the husband's kin through their very proximity, and fear of the mother-in-law is a recurring theme in interviews with women. Although fully patriarchal, the Sinhalese family has not exaggerated male dominance. None-the-less the father-husband is the social authority and his relation to all except small children is devoid of overt expressions of affection but replete with evidence of his dignity and prerogatives. It should not be implied that this patriarchalism is harsh; few relationships between Sinhalese are that.

From early childhood the male is schooled in his superiority. A family of many males is a "fortunate one," one of many

⁵ See also KAMA SUTRA OF VATSYAYNA—THE HINDU ART OF LOVE, translated by B. N. Basu and S. L. Ghosh (Calcutta 1948) Chap. XI.

daughters is "burdened." Frequently households have a single bed, used by the father; a second one is for the eldest son. The men-folk are served their meals; the women eat what remains in the kitchen. Male children roam and play through the village while their sisters are closely bound with household tasks. The position of the father is that of one to whom services are due, priorities accepted and deference paid. There is a deeply seated belief that in marriage the loyalty and subservience of the wife to husband must be complete. He stands in the place of her father as well as in the role of husband, in the village view. On the other hand it is generally agreed that the husband owes his first allegiance to his own parents rather than to his wife. It is the role of woman to lose herself in service to husband but for him marriage never commands the full part of his familial obligations. The child is educated to these concepts by precept and by the overt roles enacted before him, and the sex roles of childhood are consistent with those of later life. Although women can exert influence in many situations, decisions are ultimately those of the husband-father. Rarely a rigid disciplinarian, the father is still *master* in a society where that concept has a living feudal history.

THE SOCIAL MILIEU OF FERTILITY IN A PEASANT VILLAGE⁶

The village utilized for intensive investigation is in the Ceylon "Low Country," six miles from a market town. Its marital institutions and folkways are generally consistent with previous generalizations.

The mean age at marriage for village women (based on a one-fourth sample of existing marital units) was 21.9 years, and for men, 28.4 years. There is some reason to believe that the

⁶ This village has been given close attention for three years and intensive continuous study for more than one year of this period. One member of the study team had been reared in the village and rapport was excellent. A monograph on its social organization and institutional structure is now in preparation. One phase of this was reported upon in "The Ceylonese Village and the New Value System" *op. cit.* The present report relies upon two special inquiries, in addition to ethnologic data. One of these is a one-fourth sample of the 400 village households, the other an intensive study of fertility attitudes in a sub-sample of eighteen mothers. The sources of statistical statements will be evident in the text.

age of women at marriage is rising but there is no evidence of change among men. (Thus women who married after 1937 had a mean age of 23.3.) Village opinion gives 21 or 22 as the ideal age for a bride and about 25 for the groom. (This was statistically verified only in the sample of eighteen mothers.) It is probable that the high ages at marriage are influenced by the difficulties of dowry, including the responsibility of brothers toward sisters. The household sample revealed that the average dowry had amounted to 220 Rupees; in marriages since 1937 it averaged 266 Rupees. (There was probably in fact a lesser inflation in husbands than in incomes.) About one-fourth of the couples indicated that no dowry had been given, a condition which arises from such diverse conditions as gross poverty, impositions upon the kin for providing a daughter, and a few romantic marriages. There is, however, no evidence that the proportion of dowryless matches has changed with passing years.

Indicative of social change is the fact that 4 per cent of the ninety couples claim to have married in spite of their parents wishes. These are all recent marriages, i.e. in the last twelve years. About 13 per cent married by personal choice but with parental approval. There is no evidence of increase in such permissible self choice. (There is no way of knowing how many love matches were thwarted by parents.) The remainder, over 80 per cent, and more than two-thirds of even recent marriages, had been products of *pure* parental arrangements. Fifty-seven per cent professed no previous acquaintance with spouses, the proportion being no different in recent marriages and those consummated many years ago.

This village is more emancipated than many others and is relatively prosperous, many women and men having employment on nearby rubber estates. None-the-less the great bulk of marriages conforms closely to traditional patterns. The propriety of caste, the validity of horoscope, prestige, and other conditions of marrying are fully recognized. While some youth express unconcern over such matters as caste, few if any would

violate the tradition and when they come into responsible parental roles they too will defend family honor in the marriage of their offspring. In the interviews with eighteen mothers, not one was found who defended marriage by personal choice and one of them who had so married is unhappy in her community relations.

ATTITUDES OF WOMEN TOWARD FAMILY SIZE

The typical response of any villager confronted with a question on ideal family size is one indicating human helplessness in the face of destiny. As a public health official paraphrases village women's attitudes, "God giving, what to do?" In children, as in other matters, one's destiny must be fulfilled. As to what kind of destiny the individual would prefer there is wide range of opinion. The sample of mothers, having children ranging in number from one to seven, offered evidence that many women are torn between the community valuation of the large family and a personal desire for restricted numbers. About seven of the eighteen would join with the following:⁷

Fate decides how many children we have, but of course if we were to have more we would be happy. Every woman wishes to have many children. They are a blessing. I would like ten.

But almost an equal number expressed views more consistent with a mother age 35 who after eleven years of marriage has five living children and has had one still birth and another child deceased.

These children are enough for me. I am quite satisfied. We are not very well off and if we had had any more it would have been difficult to bring them up. It is better to have a few and give them all the attention.

Although the majority tended toward one or the other of the

⁷ Interviewers recorded the statements after each interview and were not always able to make perfectly literal reconstructions or translations. Two female interviewers spent two weeks interviewing the eighteen mothers subsequent to an earlier two-week period in which one of them gained general impressions and established personal rapport with the village women.

extreme positions noted above, several gave qualified responses like that from a 40-year-old mother of three girls:

We are happy with our three children but would certainly be glad to have about two more, and we would like boys.

This last mother wishes for more children, but it seems possible that sex substitution would have been a happier alternative. Seven of the mothers stated categorically that "the number of children born to us as of this time is just right." Eleven indicated that more would have been desirable. Although the number of cases is few, it is interesting to note that mothers wishing more children were slightly younger than those who were satisfied and averaged 3.4 living children compared to 4.0 for the latter. (Existing marital unions of 20 years duration or more, in the 25 per cent household sample, had averaged 5.7 births.)

At a later point in the interviews questions were posed about the happiness of large and small families under varying conditions. These responses indicate more strongly the reluctant enthusiasm with which large numbers of children are viewed. It should be remembered however that in this context when a woman speaks of a small number of children, she may in fact mean a family which by Western standards is quite large, i.e. five or six children. Only three or four of the mothers supported infinite fertility. The majority are best represented by the following restrained and somewhat inconsistent view:

More children are better if people have the means and facilities to bring them up. If poor, then few children will be better. But what can we do? We have as many as we are destined to have. In any case it is better to have more boys than girls. Girls are economic and emotional liabilities. If we do not have adequate money we would prefer boys. Boys mean wealth, prestige, and security in old age and carrying on the family name. The more boys the better. It is just the opposite with girls.

The circumstances of interviewing unquestionably had an

effect upon the nature of responses. The most troublesome feature of conducting any field research in a Sinhalese village is the difficulty in arranging a private interview. Although men were always excluded from these discussions, neighbor women and female relatives could not always be turned aside. It was sharply evident to the interviewers that infinite numbers of children were an unqualified blessing in situations where several women were present. Children are viewed by all as a product of destiny and women feel that in expressing sentiments such as "all children are a blessing," they are voicing the mores of the community. As a test of the sincerity with which mothers view themselves as dedicated to limitless reproduction, their attitudes toward the birth of twins was sought. Nearly all were in agreement that "one at a time is plenty." In these responses the theme of children as a mother's burden took a dominant place. One mother who in group interview had conformed to community feeling now observes:

It is very difficult to bring up two children. One is bad enough without being burdened with two at once. Even in nursing the mother cannot possibly treat both alike. Both children are likely to suffer.

There is no belief among villagers that merit in the sense of spiritual attainment is derived through motherhood. Reproduction does not take one further upon the *Way*. Numbers of children do, however, reflect merit achieved in previous existences. In the words of many mothers "children are a blessing," but for a substantial proportion it might be said that *many* children are *imposed* as a blessing. It is pleasant to know that one's previous life was meritorious, but there is little conviction that fertility is spiritually beneficial.

THE UNPRODUCTIVE WIFE

This interpretation of village mothers' skeptical attitudes regarding the value of high productivity should not be construed as a belief that a childless or even single or dual-child

marriage is desirable. One or two women favored no more than one or two children, but they were exceptional even in private interviewing. No one believes that childlessness is a desirable state. Village women know that the unproductive marriage may not be the result of the wife's sterility, but they know that it is the wife toward whom community opprobrium is directed and that it is the husband who gets pity and sympathy. While villagers also pity the barren woman, the folkways of social intercourse yield partial ostracism and avoidance. The position of such a wife in village life is excellently expressed by one young mother:

I pity her. She will have no one to help her and care for her when she is ill. In old age she will have no one to sit with her and comfort her. The pleasures of having children are not known to her. If she does anything bad people say it is due to the fact that she is barren. They refer to her as the *vanda gani* (barren woman), a contemptuous term. They will not show her first to a girl who has just attained puberty. We must not meet such a woman when we set out on an auspicious task like going to a wedding or pirith ceremony, or to see a bride and groom-to-be. She is unlucky and it is believed that the business won't be a success. So she is avoided.

The lot of the childless wife is uncomfortable, and the birth of a first child is looked forward to with eagerness. Apart from social stigma, failure to conceive is evidence of great sin in a former existence. A husband is not justified in leaving a wife who bears him no children, but women recognize that children are insurance against desertion. If no sign of pregnancy has appeared after two years of marriage, steps are taken to remedy the situation. Appeals to planetary gods may be made, vows taken before regional gods, and even appeals to "demon gods" ("devil dances") utilized. Consultation with an astrologer may provide assurance that eventually all will be well. (Although appeals to the Buddha are not admitted in this village, there is an ancient temple pool in another region which has the property of inducing conception.) Continued infertility may result

in adoption through the belief that the expression of mother love is physiologically conducive to conception. Large sums may be spent on rituals designed to protect the pregnant wife and insure delivery.

ATTITUDES OF WOMEN TOWARD BIRTH CONTROL

To wish that destiny might be kind is one matter, to seek actively the prevention of birth is another. From the lips of nearly every woman came, at this suggestion, responses essentially the same. "It is a great sin to try to prevent pregnancy. You must allow all those to be born who are to be born." We must recognize that query on this matter is first interpreted by practically every woman as signifying abortion. When the distinction is drawn, the women are not so sure that it is a valid one and the idea of abortion colors statements of attitude. In an attempt to get around this difficulty, questions were posed on the assumption that a *mantram* (charm) was known that permitted intercourse without conception. Of the eighteen mothers only two admitted that a mother suffering great economic hardship and with many children would be justified in using the charm. Significantly these views came in two of the wholly private interviews, and each woman had expressed the desire for no more children; one had five living, the other, two. One says:

We consider it a misfortune to have too many children. It makes things difficult for a family. Provided one is not destroying life she is quite justified in preventing pregnancy. Women would be thankful if they knew of such a device for although they dare not confess in public, individually women would not like to have more than three children.

But for two statements like the above there were sixteen like that of another mother:

If a dead "soul" wishes to be born into your family, it would be a terrible sin to prevent its birth. We will pay for such acts in our next life. Children that are to be born to you must be

allowed to be born. That is how life goes on. We cannot and should not prevent this.

Here speaks the voice of the community, echoed by men and women alike. A rebirth in the great cycle must not be denied to any being.⁸

Abortion is well known but violently discredited. It is undoubtedly attempted, however, in instances of unmarried pregnancies. Folk knowledge ascribes abortive power to the consumption of large quantities of pineapple and of vinegar, and certain indigenous physicians who are skilled in the medicines of abortion are well known. It is not improbable that some married women resort to dietary attempts to control, but further action is surely rare. No husband or wife was induced to admit that they had actually sought to restrict birth by any means. *Coitus interruptus* is probably uncommon among married couples. There is no word for the practice in the local vocabulary and its meaning must be explained rather than simply referred to. While some unmarried youths probably practice it, the general state of affairs among the married is no doubt accurately stated by a man of many offspring: "Why should I do *that* when I am legally married and entitled to have children?"

Below the surface of decent village talk, there is, however, a widespread knowledge of a "safe period." Practically all men know of this and although few women admit knowledge of it, they undoubtedly are aware of the technique. (Men also think that women have other and more secret techniques as well.) Quite rightly the villagers have no great faith in the method, for by folk definition the safe period is the 14 days preceding menstruation. Folk physiology attributes this to the fact that as the menses approach, the womb is not clean and the sperm

⁸ This is not to say that village metaphysics adequately reflect Buddhist doctrine. Actually some liberal scholars indicate that contraception is consistent with Buddhist principles. It is interesting to note that the Buddhists have been attacked by Roman Catholics for *not* opposing birth control. The late Prime Minister of Ceylon went on record in support of the village interpretation, a position not held however, by several other prominent Buddhist political leaders.

is held up to be washed away by the oncoming flood. Similarly it is believed by women that conception will not occur so long as a mother is nursing, but one woman assured us that by personal experience she knew this was not true. This might, however, have some bearing upon the advanced age at which many children are weaned.

The safe period is not morally censored by the villagers and in discussions of the wrongness of preventing conception, this practice was not connoted. There is nothing unnatural about abstaining from intercourse. To the contrary continence is consistent with the *Buddhist Way*. Probably some couples with a number of children practice it more or less.

ATTITUDES OF MEN TOWARD FAMILY SIZE AND BIRTH CONTROL

Although the speech reactions of men were not so systematically collected as for women, it is probable that rapport was better since the interviewer himself was a member of the community. Even under these circumstances the articulation of sex matters was distasteful and relief was usually evidenced when conversation veered into less tabued areas. It is significant that no evidence of underlying ambivalent desire for limited families could be detected. Men sincerely want large families, and especially many sons: "children are prosperity." Not once in the extensive discussions with village men was there a mention of the burden of child care and the difficulties of rearing. The personal trials and burdens of parenthood are almost wholly the mother's. Father is proud parent toward his neighbors, a caresser of infants in the home, and contributor to his kin status through well-calculated marriages. He is served by his household, and the larger his small kingdom the greater his dignity and glory. Through children, especially sons, he gains status as a man, is assured that his responsibilities will be inherited by others and that he himself will have security in old age. From the male standpoint children are assets if the family is not overweighted with girls. In the latter instance, the economic cost is noticeable because the ultimate advantages are

fewer and the threat of dowry hangs for years over his head. But the remedy for this situation is simple—keep trying and eventually get boys. In the meantime girls too can tap rubber and alleviate the dowry responsibility themselves.

The whole tenor of interviews was different for men than women. The wife has no avenue of escape from the increasing demands upon her made by the growing family. (Cookery alone is an infinitely more difficult and time consuming task than in the Western farm home.) On the other hand, one may question whether the father of a large family works more assiduously to provide. The appearances are that he works no more—he merely lives less well until the youth begin earning.

Our interviewers agree that a majority of the mothers would welcome some morally suitable relief from the imminent arrival of the next baby. They also agree that the fathers see no cause for worry. Not only is high productivity defended on grounds of familistic strength and economic prosperity, suggestions of birth control are indicted morally and nationalistically.

Why should we control? During the times of the Sinhalese kings, the population was greater than that of today. The cock-bird who climbed to a house in Anuradhapura was able to go to Polonnaruwa without getting down to earth (i.e. from rooftop to rooftop).

On the level of family welfare the cross purposes of husband and wife are well illustrated:

No, I would not be worried about it (having many more children), but my wife is, since we have four already. But when I approach her she cannot resist my temptations. Even if I step onto the mat she gets a child, unlike some women.

This man's wife has spoken to him about the safe period, but he is disinterested in regulation and quite unconcerned about increasing numbers. It is not uncommon for men of middle age to imply that their wives would like to follow the safe period, but like the respondent above the wife has slight opportunity to do anything but acquiesce to his "temptations."

SEX DOMINANCE OF MALES

We have noted that in child rearing the role and status of the son is utterly different from that of the daughter, who is reared for subservience to the male. In a literal sense she is to look upon the eventual husband as her master. While some women resent it, this arises more in the mode of expression than in the fact of power. The husband's sexual authority is the most important single element for an understanding of fertility. This authority is implicit in the familial definition of marriage relationships. An illiterate woman of 45 who has had six children, observes:

Once a girl marries she wholly belongs to her husband, and her duty is first toward him. If she invites his displeasure, who will look after her and her children? A man's first loyalty is to his (blood) family and aged parents. He should never neglect them just because he has a wife. She must put up with it although it may be unpleasant for her. . . . A woman need not be educated to know how to get on harmoniously with her husband. If she is sensible she can get around him. If she is gentle about it he will come around to her point of view.

Time and again in the women's statements the word "property" appears, describing the wife. Frequent too are the allusions to transference of paternal authority from the wife's father to the husband. Marriage is a transfer and extension of unilateral authority, and the woman's lot is cast with an unknown male bred to the role of patriarch. One woman concludes, "In spite of all hardships and even cruelty the woman must never leave her husband for she belongs to him." Yet this same person was one of the few to express overtly her resentment at the male's total dominance in sexual relations. With seven children living and one deceased, she complains that it is regarded as a "primary duty of a wife to surrender at every call."

The field notes of one interviewer have implicit support in many observations, although explicit statements like the above were rare.

Much as these women detest the uncompromising nature of the husband in sex relations, many seemed to accept their servile condition with grim resignation, the destiny of all women. After much verbal manoeuvring we did succeed in getting some to be frank on the topic of husband-wife relations and they said their sentiments were spoken for the majority of the village women.

Most husbands they agreed were tyrannical in their sex relations. Intercourse was more the outcome of demand than of request. Often regardless of how tired the wife might be or how poor her physical condition, the husband would demand his pleasure. "What is the good of refusing, they will never let us alone," and, in fact they dare not refuse for "he will go to some other woman and then what will become of me and my children?" This is a genuine fear. A direct quotation from a *husband* expresses the situation, "Why do we feed and clothe them if we cannot use them as we like." (The word for "use" is that spoken in connection with any inanimate object and implies *constant* use.)

We see how the condition of economic dependence affects this issue. Once a woman is given in marriage she is expected to stick to her husband regardless of how trying married life with him may be for the simple reason that parents cannot afford to maintain her and her children nor meet the expense of a second marriage.

That these impressions are not casual ones is indicated by the independent notes of the male associate who worked in complete separation from the female interviewers.

The women are passive in sexual intercourse. The husband takes the active part. He approaches the wife in the night. To him love is the sexual act and most husbands have nothing else to do with their wives, (i.e. affectionally). The villager does not know love making. When the husband sleeps outside on the veranda, the wife may not close the door until late in the night. When the little children are asleep the father may come inside the house and engage in sexual intercourse. Much time is not wasted on this for the husbands are not experienced in fondling or making their wives happy otherwise. Wives do not question their authority in sexual matters, and whatever their demands

are ready to sacrifice to please them. The wife's birthright is the pleasing of her husband. The wife thinks so and the husband exploits the idea.

These accounts may conflict in interpretation of the wife's attitude, but the sex roles they describe are identical. The wife in her physiological role is sexual property. (We suspect that many wives infrequently experience orgasm and that its possibility is unknown to many villagers.) Sex is merely an emission by the male in probably a large proportion of unions. If the wife is satisfied, it is coincidental and of no importance in marital relationships.⁹

CONCLUSIONS

The institutional context of marriage among the Sinhalese is similar to that prevalent in many patriarchal and patrilineal societies. Spouses are the surrogates of kin and the new household is one in an interminable chain of kinship units, solidarities, and reciprocities. Sinhalese society emphasizes the consanguine unit less than some other peoples, but the power of kin is expressed strongly in the process of marrying, in social relationships and direction of loyalties of the marital household, and in predominance of paternal kin contacts.

Encompassing marriage within the domain of kin fairly effectively shuts out individual choice and romanticism. These would violate familial prerogative and parental authority and challenge the integrity of caste and status levels and traditional marriage preferences. Disregard for astrological tests of compatibility are implied. Not only must the deviating individuals choose a path of insecurity and possibly ostracism, they must jeopardize the welfare of loved ones. The marriage of a brother is relevant to his sister's marriage and both are relevant to unmarried cousins and the good name of the family line itself. In support of this, romantic marriage is abhorrent and even

⁹ That some village women receive more satisfaction in extramarital relations is probable. On the whole there is considerable tolerance toward this type of relationship. In one village, not discussed here, local gossip is heavy with observations on the seductive qualities of the married women. In another area a woman's song deals with the burden of intercourse with a husband and joys to be had from a lover.

the manifestation of affection between members of the opposite sex, whether single or married, is shocking to the point of immorality.

That such a system of familistic marriage is frequently associated with mores of high fertility is well known. Although the origins of high fertility values may indeed lie in social adaptations to a capricious death rate, the system is today self supporting and the adaptive folkways have become ends and values in themselves. In respect only to age at marriage is the Sinhalese marriage pattern inconsistent with high productivity. (In the more remote districts, however, girls are frequently married soon after puberty.) In other spheres family structure and mores are congruent with high reproduction. As in most peasant societies, the household is both a consumption and production unit. Security in old age rests upon sons. Many children mean that many helpful connections can be established through marriage. The economic cost of children is slight and the potentials are considerable. These and other advantages of the large family are implemented by folkways which, if less rational, are no less potent stimulants. The village girl fears the fate of singleness or of being a childless wife; infertility is treated with contempt. Mother achieves respect as mother, and she, cut apart from her own blood kin, must through procreation build her own intimate social world in which to find recognition and self expression. For the husband the social stimuli to a fertile marriage are many and powerful. The *esprit de corps* of the kin group stimulates child production not merely as an individual enterprise but as the fulfillment of one's role in the blood family. Children contribute to the strength of the *house* as surely as to the strength of the household. Through them parents gain acclaim, and in sons they have allies in time of crisis. Infants give both husband and wife emotional expressions denied them in their own relationship. Under the patriarchal code the husband swells in new importance as his kingdom grows and as the lines of deference and service expand and come to encompass their sons' wives and the grandchildren.

Small wonder that fertility in this life is a measure of one's merit in previous existences and that the "unnatural" prevention of birth is so readily damned by the convenient device of the kammatic cycle.

The argument is, however, incomplete and we have observed empirically a reluctance among mothers to favor a reproductive life pressing the limits of fecundity. Women do not visualize continuous pregnancies without misgivings although most accept them with fatalistic composure. Husbands to the contrary have nothing ill to say of the most fecund marriage. The difference lies in the contrasting roles of father and mother in reference to children and in the structure of the patrilineal marriage system. A wife's absolution from the threat of infertility is complete with the birth of a single child, and the difficulties of child bearing and care increases in at least arithmetical ratio to numbers. With these difficulties the husband has no part and rarely much concern, for they are the natural function of wife and her god-given means of pleasing him. The husband is also motivated by something the wife can never fully share. Children are contributions to *his* family not to hers; the wife is a contractual agent for the husband's kin; he is of its very substance. To her, children may be assets of the conjugal union but to him they are also assets in the society to which his first loyalties belong. Close emotional identification of wife with husband is difficult by the very terms of marriage and conflicting loyalties. For him, status counts where he is conditioned by lifelong loyalties; for her, lifelong loyalties have been broken by marriage and she finds her joys in a home and husband who are forever mortgaged to an alien group. Socially the wife becomes a member of the new *house* but only theoretically can emotional identification be produced by fiat. The husband wants children, first as a responsible member of kin and secondarily as an individual. The wife wants children as an individual and secondarily for her husband's kin. Through provision of children she gains security, and through their marriage with her brother's children she contributes to her own people, but the rewards are

long delayed, less dependable and less constant than those of her husband living among his own kindred.¹⁰ It might also be hazarded that unsatisfying sexual intercourse for the wife predisposes her to an attitude of resignation rather than joy in pregnancy.

The implications of these observations for the problem of controlled fertility leave room for the introduction of contraceptive practice. No doubt a substantial minority of village women are today trying to reduce the frequency of pregnancies. Lack of technical knowledge is perhaps no greater handicap than the unsympathetic attitudes of sex dominant males. It seems fair to conclude that if women were provided with simple contraceptive techniques which were rationalized to moral precepts, and unknown to husbands, the more youthful mothers of several children would use them. Of these conditioning factors "moral rationalization" is probably the easiest, for the Buddhist position is not doctrinaire and the laity are skilled in compromise with even rigid precepts. Since the secret use of such devices is improbable, we might consider the possibility that husbands would abet their wives provided there was no interference with sexual prerogatives. This course implies a shift in viewpoint for husbands, and a shift from a position strongly supported by family structure. It is certain that the entire situation is different from one in which religious objections are uppermost. Here sex satisfaction is a male prerogative rather than a joint one and the large family has tangible advantages. Increasing numbers of children pay increasing dividends to the one who dominates sex relations. To assume that this domination can be tempered with great doses of husbandly sympathy for the wife's position is to look for a companionate marriage in a society which consistently abhors it.

The critical point for the diffusion of contraceptive practices

¹⁰ Comparative studies of husband-wife relations in matrilineal-matrilocal and patrilineal-patrilocal ones would be valuable. Both forms are recognized in Sinhalese law and are practiced, although the form discussed here is the more favored. The present argument presenting the wife in the role of sexual property of a kin group with the husband as the legitimate actor, might be supported by the presence of, now illegal, fraternal polyandry.

is in the husband-wife relationship rather than in religious sanctions or even the economic value of large families. Educational and public relations techniques cannot easily surmount the conjoined effects of male sex dominance and distinctive male rewards for numerous progeny. Even under urban conditions and values, these factors may retard a small family movement more than might be expected from the experiences of Western nations.

ANNOTATIONS

PREVENTION OF ECLAMPSIA AND PRE-ECLAMPSIA

TOXEMIA is the most frequent complication of pregnancy and is responsible for approximately one-third of the maternal deaths in the United States. The prevention of toxemia, therefore, is a major objective of antenatal supervision and the need for better preventive measures is great. The successful prevention of eclampsia in the Women's Hospital, Sydney, Australia, by an intensive program of prenatal care described in two recent articles (1,2) should be of much interest to all concerned with the care of prenatal patients.

The annual incidence of eclampsia among "booked" patients at the Women's Hospital, Sydney, had been from 1.2 to 2.5 per 1,000 patients from 1945 to 1947 and had been at a similar level since 1935. Following the introduction of new standards for care in 1948, there was a rapid reduction in eclampsia and for the period March, 1950 to October 1951, not a single case of eclampsia occurred among 6,600 booked patients. In the Women's Hospitals in Brisbane and Melbourne from 1946 to 1950, the incidence of eclampsia was 1.9 and 3.1 per 1,000 patients, respectively. Also, in Sydney, "extremely few of the graver types of pre-eclampsia have been encountered. Not one caesarian section was performed during the year ending March, 1951, for pre-eclampsia in a booked patient" (1).

The measures developed in the intensified antenatal program are described by Hamlin (1) under seven steps. Three are concerned with procedures adopted to keep patients under con-

1. Hamlin, R. H. J.: The Prevention of Eclampsia and Pre-Eclampsia. *The Lancet*, January 12, 1952, No. 6698, p. 64.

2. Hughes, T. Dixon: The Importance of the Relativity of Blood Pressure and Other Signs in the Prevention of Eclampsia. *Medical Journal of Australia*, 1951, ii, p. 871.

stant supervision and to coordinate the prenatal care of patients booked for hospital confinement who lived in the country or suburbs and received care from private physicians or government prenatal clinics with that of the hospital. The other four steps relating to specific provisions or standards for care are of general interest.

1. *Lectures.* Two lectures were given to all new patients: one by the medical superintendent to allay fear, to explain the need for regular prenatal supervision and the dangers of excess weight gain during pregnancy, and to outline the basic principles of a high-protein, high-vitamin, and low-carbohydrate diet; the other by the dietitian who elaborates in a practical way the details of the diet.

2. *Blood Pressure.* Any patient who, after the twentieth week, had a diastolic blood pressure of 85 or more, or a systolic blood pressure of 130 or more, where original readings had been less, were seen more frequently and given special supervision. Hughes (2) stresses the significance of a change in the blood pressure level and considers any 10° rise in the diastolic pressure a warning, and if accompanied by a gain of more than one pound per week, the patient is suspect.

3. *Edema and Diet.* Digital edema sufficient to cause a ring to be uncomfortably tight at the 31st week, especially in young primiparas, is considered a warning sign. If not controlled, the patient "will almost certainly have hypertension by the 37th or 38th week or in labour." Such patients were referred to the dietitian for precise instructions about a high-protein, high-vitamin, low-carbohydrate diet in which salt was restricted. If the excess weight and edema did not respond, or if there was a rise in blood pressure, patients with digital edema were admitted to the hospital.

4. *Diet.* The foregoing procedures brought a striking reduction in eclampsia and pre-eclampsia but mild pre-eclampsies were still frequent. In 1950, increasing control over rate of weight gain between the vital 20th and 30th weeks began to be exerted; and the numbers of mild pre-eclampsies "are steadily falling." A gain of more than eight pounds in this period is considered "evidence that pathological processes are already disturbing the *milieu intérieur*."

Hamlin concludes that the disease which appears as eclampsia in late pregnancy can be recognized several months earlier and is probably of metabolic origin. He considers that the dietetic attack from the start of pregnancy, and especially between the 20th and 30th weeks, has been responsible for eliminating eclampsia and severe pre-eclampsia in the Women's Hospital in Sydney.

DOROTHY G. WIEHL

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SOCIAL PRESSURES IN INFORMAL GROUPS A STUDY OF HUMAN FACTORS IN HOUSING¹

THE relationship of housing to health has been studied in various ways. The book, *SOCIAL PRESSURES IN INFORMAL GROUPS, A STUDY OF HUMAN FACTORS IN HOUSING*, is the report of an investigation to find out the extent to which housing meets social needs. It is the study of people's values, goals and attitudes and opinions in a specific housing unit. This is an aspect of housing which has had little study; therefore, this report is of considerable interest.

A special group of 270 student veteran families in 1946 moved into a temporary housing project constructed and managed by the Massachusetts Institute of Technology. This new housing project offered ample opportunity for the investigations undertaken at the suggestion and with the financial support of the Albert Farwell Bemis Foundation, established at M.I.T. in 1938 for housing research.

In the early stages of the investigation, information which was gathered by the three techniques: the use of informants, observation and random informal interviewing, was the base and guide for all later attempts at systematic data collection and experimentation. Six trained interviewers were employed to administer the standardized interview to each wife in the entire 270 households. While there was a fixed schedule of questions, the interviewee was encouraged by nondirective

¹ Festinger, Leon; Schachter, Stanley; and Back, Kurt: *SOCIAL PRESSURES IN INFORMAL GROUPS, A STUDY OF HUMAN FACTORS IN HOUSING*. Harper & Brothers, New York, 1950.

probing to elaborate, illustrate, or explain her answers. The interview was designed to get information about each individual's attitude toward the tenants' organization, to determine the sociometric structure (face-to-face relationships), and the search for any jealousies between the two halves of the housing project. The following specific questions were asked:

1. How do you like living here?
2. We understand there is a tenants' organization here—
 - a. What do you think of it?
 - b. Are you active in it?
3. What three people in Westgate or Westgate West do you see most of socially?
4. If a married friend of yours without children had a choice between Westgate and Westgate West, which would you advise him to choose? Why?
5. Would you say there were any differences in economic and social background between people living in Westgate or Westgate West? What kind?
6. How much longer are you going to be at Tech.?
7. How long have you been living in this house? How long in Westgate (or Westgate West)?

The information obtained enabled the investigator to study the pattern of social relationships as a basis for an understanding of the formation of group norms, standards, or attitudes. It is assumed that a common understanding and a common set of attitudes will be achieved by those individuals who frequently communicate and interact with one another.

The homogeneity of the members of the group was studied. The community contained contemporary members who did not have a long history of residence in the housing units. The population exhibited marked homogeneity along the sociological dimensions of class, economic status, age, occupation, and marital status. The residents were married veteran students at M.I.T., aged 20–35 years, from upper middle-class homes. The financial resources were limited—\$90.00 monthly government allotment. The majority of Westgaters had the same interests since all had chosen a technical college. The leisure-time activities reflected these technical interests—amateur mechanics,

dark-room work and radio building. Since there was an over-all satisfaction with the social life, it was suggested that community homogeneity promotes satisfactory social life.

Emphasis was placed on the ecological determinants of group structure. There was a strong relationship between sociometric choice of friends and physical distance, the greatest number of choices being made to people living closest and fewer social contacts being made as the distance increased. Since contacts must be made before a friendship can develop, the design and position of the homes will determine in part the number of friendships made in a community.

The authors devote the major portion of the remainder of the book to an analysis, in terms of group standards and communication, of the reactions of each court and building to the tenants' organization. One-fourth of the population were favorable and active in the organization and another fourth were favorable but inactive. The remaining population were either indifferent or mildly hostile. In general, the people who favored the organization had had previous organization experience, were active in the formation of the tenants' organization and had close friendships with other active members.

It was possible to study the attitude toward the tenants' organization within and between the courts of the housing project. There was homogeneous behavior within many courts probably because these social groupings had formed cohesive units before the tenants' organization was begun. Of the section of the housing unit which was not occupied until after the tenants' organization was started, there was a greater degree of uniformity of attitudes formed independent of the individual courts since group attitudes for each court had not had time to develop.

The book concluded with discussions of the problem of practical applications in the field of housing written by Catherine Bauer, a sociologist, and Robert Kennedy, an architect.

Miss Bauer felt that from this report planners of housing units could learn the importance of the face-to-face group, and the direct relation of building arrangement and entrance orientation to friendship formation. Mr. Kennedy expressed the opinion that the architect is poorly prepared to meet the prob-

lem of planning housing for optimal social conditions. More research is needed to determine the fundamental social needs and patterns of human beings.

MARGUERITE KELLER

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MORTALITY AND SURVIVAL IN CANCER OF THE STOMACH¹

CONSIDERABLY more than 100,000 patients visit the Mayo Clinic annually. Of these patients, approximately 10 per cent are found to have a malignant neoplasm and one in twenty of these neoplasms is gastric.

This report from the Mayo Clinic examines the experience of forty-three years, from 1907 through 1949, during which time 9,620 patients were operated on for cancer of the stomach. In this analysis the authors are concerned mainly with patients who had surgical treatment and only summary statistics are presented. The more detailed analyses are to be published in later reports.

For the results to be representative of the groups under investigation, it was necessary to try to follow every patient until circumstances arose which made this impossible. The follow-up of the 9,620 patients surgically treated was exceptionally good. Approximately 99 per cent were traced regardless of the period of time that had elapsed since the patient underwent surgery.

Survival studies such as this one, which contain comprehensive and systematic follow-up of patients with chronic disease, are of utmost importance in revealing the degree of effectiveness of the present methods of treatment and prevention, and disclose the areas in which more research must be done.

The authors discuss sex distribution and age in relation to cancer of the stomach. The most striking fact is that the biologic inferiority of the male clearly reveals itself in this disease

¹ Berkson, Joseph; Walters, Waltman; Gray, Howard K.; and Priestley, James T.: A Statistical Summary of the Experience of the Mayo Clinic. *Proceedings of the Staff Meetings of the Mayo Clinic*, April 9, 1952, 27, No. 8, pp. 137-151.

in the numerical excess of males over females. Males with gastric cancer outnumber females in the ratio of 3.4 to 1. Of the males, 35 per cent were found in the 50-59 year age group; 31 per cent were 60-69 years of age; and 18 per cent were in the decade 40-49 years. Among the females there was less concentration of cases in any one age group; 32 per cent of the female patients were 50-59 years of age; 28 per cent were 60-69 years; and 22 per cent fell in the decade 40-49 years.

Hospital mortality rates following gastric resection again reveal the vital inferiority of the male. With the exception of the age group 70-79 years, females consistently had a smaller rate of hospital mortality than males.

The authors also bring out that of the 9,620 operations performed during the period 1907-1949, 47.8 per cent were gastric resections, 13.8 per cent were palliative operations, and 38.4 per cent were exploratory laparotomies, with hospital mortality rates of 13.3, 12.3, and 3.8 per cent, respectively.

Survival rates following operation are presented for the three main operative groups. The authors estimate that of all patients who underwent a resection, 31.6 per cent will be living five years after operation, 23.2 per cent ten years, and 12.2 per cent twenty years after operation. Almost all of the patients who underwent either palliative operations or exploratory laparotomies died within the following five years.

Improvement in outlook for the patient with gastric cancer is discussed. The fate of patients with gastric cancer is compared for two periods, 1907-1916 and 1940-1949. In the early period, out of one hundred patients who had a diagnosis of cancer of the stomach, only five could be expected to be living five years later. In the later decade, 1940-1949, the expected number of patients who would be alive five years after the cancer was diagnosed had increased to fourteen. This is an increase of only nine persons per 100, but nevertheless an improvement of 180 per cent. In 1907-1916, only 60 per cent of the patients could be subjected to a laparotomy. Today that figure has risen to 80 per cent. Formerly, only 19 per cent of the patients with gastric cancer survived resection. Today 40 per cent survive the same operation.

Rather than leave the reader with a false impression as to

the efficiency of surgical therapy, the authors present an analysis of how 86 of every 100 patients are lost due to gastric cancer. Out of 86 patients examined and diagnosed, 20 were judged inoperable on physical examination. In 36, the lesion was found not resectable at laparotomy. Four were hospital deaths and 26 died within five years following operation. Thus, 56 of 86 patients were lost because the disease had advanced too far for surgical intervention to be of any assistance. If these 56 patients came to the surgeon when the cancer was in a resectable state ". . . then without any improvement in the surgical results over what we have at present . . . , " the number of survivors would be more than doubled.

Such is the evidence that reveals the importance of early diagnosis and treatment in cancer of the stomach.

KATHERINE SIMON

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DIFFERENTIAL USE OF HEALTH RESOURCES BY RURAL PEOPLE¹

"**D**IFFERENTIAL Use of Health Resources by Rural People" is the title of the second report on a study of the utilization of health resources by a sample of rural families in selected counties in New York State. The study was conducted by the Department of Rural Sociology, Cornell University, in cooperation with the Bureau of Agricultural Economics, U. S. Department of Agriculture.

This second report includes data on the volume of medical calls over a period of a year. The total number of medical calls by a physician per 1,000 population was 3,500 in Chautauqua County, 3,600 in Cortland, and 4,600 in Oswego and Livingston Counties. The number of home calls was 300 in Chautauqua, 400 in Cortland, 600 in Livingston, and 800 per 1,000 population in Oswego.

On the assumption that people seek medical care voluntarily when they judge it to be necessary and that their judgment is

¹ Larson, Olaf F. and Hay, Donald G.: Differential Use of Health Resources by Rural People. *New York State Journal of Medicine*, January 1, 1952, 52: No. 1, pp. 43-49.

influenced by social and economic factors, the authors have investigated the relationship between the use of medical care and certain of these factors which are measurable. The indices which were used are as follows: Age, sex, residence, occupation, income, socio-economic status, participation of the household heads and homemakers in social organizations, education, and urban experience.

Age and Sex. Females aged 20 and over consistently reported a higher proportion using the services of a private physician than did males of the same age. The authors stated that the age-sex differences which they found ". . . are not only biologic. They also reflect the social roles of the individual, as age and sex are important determinants of these roles."

Residence and Occupation. The households were divided into three residential-occupational groups: (1) open-country farmer; (2) rural resident—head nonfarmer; and (3) village resident. In all four counties the open-country farmer households reported the lowest proportion using the services of a general physician.

Income. The households were divided into three net cash annual income groups: under \$1,000, \$1,000 to \$2,999, and \$3,000 and over. "The positive association between use of all forms of health resources and family income is one of the most marked and consistent of any examined." The proportions of households and individuals using the services of a general physician and of a medical specialist increased as income increased.

Education. The households were classified according to the educational attainment of the homemaker on the assumption that she has the most influence in determining the health use pattern in the household. Four divisions of completed education of the homemaker were made: (1) under 9 grades; (2) 9 to 11 grades; (3) 12 grades; and (4) one or more years of college. There was no consistent relationship between the use of a physician by the household or the individual and the educational attainment of the homemaker. There was, however, a tendency for households with homemakers with the most education to avail themselves of services of a preventive nature.

Urban Influence. Households were divided into those living

in: (1) urban-centered communities; (2) communities adjoining urban-centered communities; and (3) outlying communities. There was no consistent relationship between the proportions of households or individuals using the services of a general physician and the type of community in which they resided. Households 'residing' in outlying communities reported, however, consistently lower proportions using the services of a medical specialist.

It was felt that the first report provided interesting and valuable data on the practice of medicine in rural areas. This paper which adds data for two more counties and also an analysis of the variables connected with the differential use of health resources increases the value of the study.

DORIS TUCHER

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DEMOGRAPHIC YEARBOOK, 1951¹

THE 1951 DEMOGRAPHIC YEARBOOK is the third in the series put out by the United Nations, and extends the materials presented through the year 1950, wherever possible. Both in geographic scope and in attention to the limitations of the data, marked progress has been achieved over the two earlier issues (for 1948 and 1949-50). In either respect the YEARBOOK series is already greatly superior to previous compilations in the field of population, and there is reason to expect that future volumes will be substantially improved over the ones published so far. Though the state of population statistics is badly underdeveloped in most of the world and existing data are often inaccurate and ambiguous, the YEARBOOK very probably provides the best summary set of empirical materials available in the social sciences.

Because of the extensive and rapidly accumulating amount of materials at their disposal, the YEARBOOK editors have adopted a plan of rotation of topics to be stressed in successive issues. It is expected that the cycle will be completed at intervals of about five years. The topics selected for emphasis in the

¹ United Nations, Statistical Office. DEMOGRAPHIC YEARBOOK, 1951, New York, 1951, 608 pp., \$6.00.

1949-50 volume were marriage and fertility, and the 1951 issue stresses mortality. Users of the latest YEARBOOK will want to consult the cumulative list of tables on pages 579-80, which provides a quick and valuable overview of the contents of the first three issues. If sufficient data from the numerous censuses taken in 1950 and 1951 become available in time, the fourth volume will emphasize geographic distribution of the population.

A number of basic tables are to be carried in all issues, with appropriate revisions and addition of more current information. In the 1951 publication, the standard table on population and area presents latest census count, recent population estimates and 1950 crude density. A useful summary table has been appended for the first time, showing 1950 population estimates, area, and density for the world and continents. Also continued from previous volumes are a compilation of census population counts and intercensal rates of increase since 1900, and a table on estimates of total population by individual years between 1932 and 1950. The final population table, on sex-age distribution, presents only material not shown in earlier issues.

In vital statistics the tables so far regarded as basic and continued in the latest publication are those on births, deaths, and marriages (numbers and crude rates), birth rates by age of mother, death rates by sex and age, number of deaths under one year, and infant mortality rates. All of these are more inclusive than the corresponding compilations of earlier issues.

The data on international migration cover major categories of departures and arrivals for 1946-1950 (permanent migrants, temporary migrants, etc.) and, for 1948-1950, emigrants by country of intended residence, immigrants by country of last residence, and emigrants and immigrants by sex and age.

Compilations presented for the first time include birth order rates (number in each birth order per 1,000 women aged 10-49), number of divorces, number of stillbirths, and stillbirths per 1,000 live births. In mortality, the table on deaths by month of occurrence is new and should prove useful for analyzing seasonal patterns. Also new are two tables on deaths classified by cause, the first giving absolute figures and rates per 100,000 total population, and the second providing sex-age

distributions of the number dying from each cause. Two valuable additions are the retrospective tables on birth and death rates for 1905-1930, in which averages are presented for the periods 1905-1909, 1911-1913, 1921-1925, and 1926-1930. Those interested in historical series will find it convenient to use these tables in conjunction with the pre-1900 compilations made by the French central statistical office.²

The remaining six tables in the latest *YEARBOOK* bring to more recent date materials which were shown in the 1948 issue and omitted from the volume for 1949-50. All of these deal with mortality data and are considerably more inclusive than the earlier compilations. They cover deaths by sex and age (under 1, 1-4, quinquennial groups from 5-9 to 80-84, and 85 and over); deaths under one year of age, by sex and subdivisions of the first year of life; the corresponding mortality rates (per 1,000 live births); and three sets of life table values, showing death rates, survivors, and expectation of life at selected ages for each sex.

The three introductory chapters will be valuable for general reference, as well as for making use of specific data in the *YEARBOOK*. One, dealing with recent mortality trends, contains an excellent discussion of the effects of age composition on crude death rates and the consequent limitations of such measures for studying long-term trends or for making international comparisons. A second reviews the history of international classifications of causes of death and has an informative section on some of the problems of accuracy and comparability which arise in dealing with statistics in this field.

Almost all the data in the *YEARBOOK* series are official figures, mainly obtained from questionnaires submitted by the United Nations staff to governments but also from official publications. Unofficial estimates or revisions are presented infrequently and apparently only after permission is given by the governments concerned. Not only are many of the materials inaccurate but also, in their attempts to indicate the limitations of specific figures, the *YEARBOOK* editors have had to rely almost through-

² See France, *Statistique Générale: STATISTIQUE ANNUELLE DU MOUVEMENT DE LA POPULATION. 1902*. Paris 1904, pp. 83-151. For each of the areas shown (twenty-six countries and numerous smaller regions) the data run from the beginning of vital registration to a terminal year close to 1900.

out on appraisals made by individual governmental agencies.

Within these restrictions, the editors are trying progressively to warn YEARBOOK users against statistical pitfalls. The three introductory chapters are replete with general cautions on warranted and unwarranted applications of the data, and the tables themselves are liberally annotated with specific indications to the same ends. Table 1, on total population and area, provides more detailed indications of the manner in which recent population estimates were made than were afforded by the 1949-50 YEARBOOK. As a result, closer assessment of the reliability of these data is now possible. In addition, a code entry, indicating adequacy or inadequacy of the figures, has been inserted wherever feasible in the basic tables on vital statistics (numbers of births, deaths, infant deaths, and marriages, and the corresponding rates). However, it should be pointed out that the codes are based on official appraisals and that no appraisal is shown for a large number of areas.

Documentation of the reliability of the YEARBOOK materials remains a good deal short of satisfactory, as the editors recognize fully. Future progress in this direction will undoubtedly be made, but will not come easily in view of the restrictions under which the United Nations compilers must operate. Users of the 1951 YEARBOOK, and probably of future issues as well, should keep in mind at least these rules of thumb: (1) The estimates of total population shown in Table 3 for 1932-1950 should be considered in conjunction with the codes shown in Table 1 for estimates close to 1950. Where a Table 1 code indicates that recent estimates may be subject to serious error, the same probably holds for the earlier estimates in Table 3. On the other hand, the existence of apparently useful estimates for years close to 1950 need not indicate that earlier estimates are of similar reliability. (2) Where a code entry in any of the basic tables on vital statistics is "... " (no appraisal available), the quality of the data is likely to range from only fair to poor or very poor. (3) The code entries in these tables tend to pertain to recent years. Where the code is "... " or "U" (registration incomplete or affected by irregularities), the corresponding figures for earlier years are probably of only fair to poor reliability. (4) Where a code is "... " or "U" in the tables on

numbers of births and deaths or on crude birth and death rates, the quality of more detailed data on fertility and mortality (e.g., age-specific birth and death rates) is even more suspect. In particular, this may be true of the life table values shown in Tables 27-29. (5) Retrospective and more detailed materials on fertility and mortality may be unreliable, even if the code entry in the basic tables is "C" (registration data appraised as complete or virtually complete). (6) Where the quality of the vital statistics of an area is suspect but indeterminate, it will often be useful to ascertain information on the reliability of its censuses. If the latter are believed to be subject to substantial error, vital registration is likely to be even more deficient. It is to be hoped that the YEARBOOK editors will provide indications of the quality of census-taking in succeeding issues.

The latest YEARBOOK, like the previous ones, will be indispensable to both general and specialized students of population.

GEORGE J. STOLNITZ

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POPULATION GROWTH IN MALAYA¹

THIS brief but pithy study is a pace-setting analysis of the population situation in one of the numerous regions where detailed studies have been lacking. Its author is a member of the Malayan Civil Service and he has made skillful use of the censuses of 1911, 1921, 1931, and 1947, and of registration and hospital data. His results are of interest to all persons concerned with technical assistance programs or population trends in southeast Asia. One may hope it will inspire similar analyses for other little known demographic areas. Malaya—which here means the Federation of Malaya and the Colony of Singapore, like many other presently underdeveloped countries, finds its birth rates high, its death rates falling rapidly, and its population getting younger in age distribution. The future

¹ Smith, T. E.: *POPULATION GROWTH IN MALAYA*, with Foreword by Frank W. Notestein. Royal Institute of International Affairs, London and New York, 1952, viii + 126 pages, \$3.00.

economic welfare of its population depends largely on the trends of its vital statistics.

Malaya is somewhat unique in several respects. Its population density is 45 per km², compared with 109 and 111 for India and Ceylon. (For comparison: United States, 19; Cuba, 45). It is the world's largest exporter of rubber and tin, and ranks high in the exportation of vegetable oils, nuts, tapioca and canned pineapples. Its future prosperity is dependent on the state of world trade, but it has considerable purchasing power in world markets. Its population composition is also unique. Males constituted 53.6 per cent of its 5.9 millions in 1947 and were racially divided as follows: Malaysians, 40.2 per cent; Chinese, 45.1 per cent; Indians, 11.9 per cent; others 2.8 per cent. Even a fair proportion of the Malays are immigrants.

There is thus a lack of racial and cultural homogeneity, associated with equally marked differences in language, residence, occupation, social status, and social function. The Chinese tend to be urban, the Malaysians rural, and the Indians plantation recruits. The Chinese lead in trade and industry; they are now the most numerous element and seem likely to increase faster in the near future than the native element; they seem likely to lead in the westernization and modernization of the culture. Our author throws little light on this inviting field of race rivalry and possible race amalgamation. Herein are involved, however, basic problems of future social and economic integration, internal cooperation and the development of a genuine Malayan nationalism.

Following a brief and barely adequate description of the population of the region as a whole, the author treats in successive chapters each of the three major elements, setting forth their distribution by a number of basic demographic and social categories. The high points in each case are the calculations of the age-specific birth and death rates and the gross and net fertility rates. He finds the latter to be 1.7 for Malaysians and 2.6 for the Chinese, with the Indians possibly somewhat higher than the latter. The reader is certain to be impressed with the ingenuity of the author in testing his data for internal evidences of consistency, completeness, and reliability. He fully realizes his results are only first approximations, though he does use the

word "certain" (73) for his results for the gross fertility rate of the Chinese, a result that seems to this reviewer too high.

It is certain that the Chinese have higher survival rates than the other elements, but how can one be certain of fertility rates when the sex ratio and the age-specific death rates are more or less uncertain? The net fertility for the Chinese is calculated on two different assumptions (80) neither of which can be 100 per cent correct. There is considerable doubt as to the very high sex ratio derived from census and registration data; and this ratio remains high for all age classes up to 30-34, where it would have been little affected by migration. One acquires a feeling that quite a few Chinese females were never born, and even wonders whether some of them ever died. The age-specific death rates for females are found to be smaller, and in some cases much smaller, than for males at all ages. Obviously, if the age-specific death rates for females are too low, the net fertility rate would be exaggerated.

The two final chapters deal with the economic base and the future prospects. With various reservations the author on the whole concludes that Malaya has "bright chances" (120) of solving her own population problem but the case for such conclusion is far from convincing. Like most demographers who have written on this question recently he assumes that if Malaya is to escape the Malthusian horrors, its economic and social evolution must parallel that experienced by the West during recent generations. One can only wonder how this is to be accomplished. The differences both demographically and sociologically are far more numerous than the similarities to western conditions, either now or in the nineteenth century.

Space does not permit extended discussion but I would like to call attention to one difference that is usually, if not always, overlooked. The age of economic and social individualism is rapidly passing. The great social objectives in Malaya are nationalism, westernization in the externals of life, and planning for the welfare state. To make the transition from a relatively simple agrarian society to a complex, industrial one will require a large accumulation of capital, for it is capital in the diversified forms of an advanced technology that is the real wonder worker. When one recalls that our own and England's

period of capital accumulation was marked by extensive exploitation of labor; and when one observes that Russia is acquiring its capital equipment through unprecedented slave labor, one wonders how a society aiming directly for the soft amenities of the modern welfare state can accumulate the essential basis therefor. Perhaps it can be done, but there is no precedent. However as our author says (117): "any attempt to predict Oriental behavior by Western standards is an extremely hazardous undertaking."

FRANK H. HANKINS

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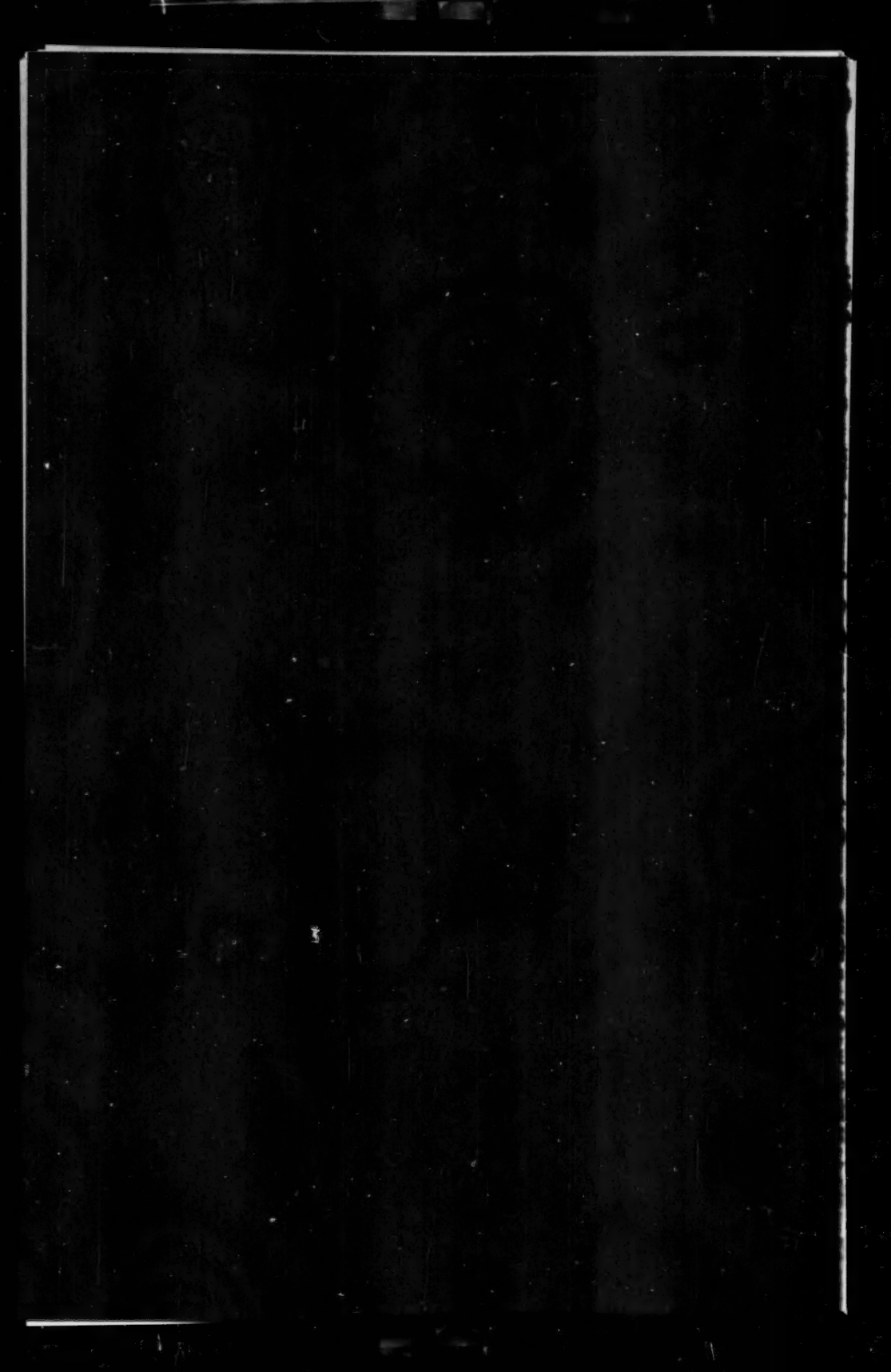
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